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EXPLORING YOUR MIND

MAKING SCIENCE HUMAN

Exploring Your Mind

with the Psychologists

By

ALBERT EDWARD WIGGAM

Author of THE NEW DECALOGUE OF SCIENCE

THE FRUIT OF THE FAMILY TREE, THE NEXT AGE OF MAN



BLUE RIBBON BOOKS

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EXPLORING YOUR MIND

I

ONE of the easiest things in the world to do is to write a book expressing your own opinions. One of the hardest things to do is to write a book expressing somebody else's opinions. This book is made up entirely of personal interviews with some of our leading psychologists and, therefore, expresses other people's opinions. It happens in most cases they are by force of evidence my own opinions; but this does not lessen the difficulty of giving them a living expression.

Men and women never needed psychology so much as they need it to-day. Young men and women need it in order to measure their own mental traits and capacities with a view to choosing their careers early and wisely; adults need it in order to make the mental adjustments necessary for meeting the stress and strain and keeping the swift pace of modern life; business men need it to help them select employees; parents and educators need it as an aid in rearing and educating children; all need it in order to secure the highest effectiveness and happiness. You can not achieve these things in the fullest measure without the new knowledge of your own mind and personality that the psychologists have given us.

For these reasons I have devoted this present volume almost entirely to interviews on psychology, especially to a few of the remarkable achievements of the psychologists in measuring the mind and personality, although it is only a partial introduction to this

vast new field and not in any sense a systematic treatise on the subject. It is the first volume of a general series which I hope my time and strength will permit me to bring to the public during the coming years under the general title, *Making Science Human*.

What I have tried to achieve in this book has been to write every-day psychology for everybody in a new way by making a number of the great psychologists of our time real, living and friendly personalities in your life as they have come to be in mine. I wish I could enable them to help you as much as they have helped me. You can not go to their laboratories and homes and visit them; you can not go out on the golf course or go fishing or play billiards and talk with them about science, life, work, habit, success, failure, duty, beauty, death and destiny, as I have done with some of them for a good many years; and they can not come to visit with you.

You can not even read all of their books because most of them are of necessity written in a technical language as unknown to the general public as Sanskrit. Yet, you should know these men and women in a warm and friendly way, and they should know you and would like to know you in the same way, for you have so much in common; and, moreover, I believe that such men and women as are brought to you in this book are among the saviors and prophets of the modern world, and the originators and custodians of most of its progress.

It has appeared to me, therefore, that the most helpful thing I could do would be to bring a living message from them to you and, in so far as possible, bring their personalities with it.

It may seem to you that writing an interview is a very easy matter. You perhaps have in mind the newspaper reporter who chats a while with some pass-

ing traveler, some new arrival in your city, and then hastens back to the office and within a few minutes a report, partly true, partly imaginative, of what the stranger said is being sold in the newspapers on the street. The stranger is usually pleased and surprised that he has talked so well and expressed so many new and important ideas. Since I was once a police and hotel reporter myself, I confess this idea of a great many interviews is entirely justified.

But a careful interview that seeks to interpret a scientist's life-work and thought, as well as his personality, is a very different and a vastly more arduous undertaking.

An interview of this character, instead of being a mere stenographic record of a few offhand remarks, becomes, if it be successful in achieving its aim, as genuine a creation of art as any other form of literary expression, and a new contribution to popular science as well.

It may be therefore, that the reader would be interested in a glimpse of the writer's own workshop and in learning something of the mechanics of a book such as this. My only reason for being so personal is that I have been trying for years to encourage some of the abler young men and women of our colleges and universities to consider scientific journalism as a possible life profession. There are only a few such persons living, and for every really qualified scientific journalist to-day we need at least a score, perhaps a hundred. Should any young man or woman who chances to read this book aspire to such a profession, may I say there are four things you must do if you would be worthy of the material you work with, on the one hand, and the objective to be achieved, on the other, which is *the enlightenment and inspiration of the public through the artistic interpretation of science.*

In the first place, you must become thoroughly infused with the scientific spirit as the very core and meaning of your own life. All the discoveries of science have come from the fact that a few unique and wonderful men have entered into a new kind of life, a new sort of intellectual existence, a new type of spiritual devotion never before known in the world. You must therefore become imbued with this exalting attitude of mind, this unconcern for anything except truth, this hatred of dogma, this fearlessness in challenging tradition, particularly the tradition of your own opinions, and you must become possessed with the scientist's endless passion for knowledge.

In the second place, you must become quite thoroughly and technically acquainted with some one field of science; you must learn scientific methods as well as imbibe the scientific spirit. It matters not what this field shall be, if only it be *science*. This is the only thing that will preserve you from writing about near-science, and near-science isn't science at all; it is the only thing that will teach you how to distinguish the fine shades of falsity that lie between science and pseudo-science—sometimes a very difficult and delicate logical task.

In the third place, you must learn the art and technique of journalistic presentation. Indeed, I may make bold to say that to learn something of the art of writing and journalistic mechanics would not, even among some scientists, come amiss. The larger portion of science must of necessity be written in a secret language known only to the members of the inner temple; otherwise, it would not be science.

It is not, however, unscientific, as some scientists seem to believe, for any one to make his meaning clear. Every scientific journalist must take heed, and it would not detract from the sum of either pure or ap-

plied science if some scientists should take heed, of the principle expressed in a motto I have had for many years pasted on the edge of my desk, one that I never violate without a conviction of sin, which reads: "A great man is a man who is willing to use a little word when he knows a big one that means the same thing."

Finally, if you wish to write, not a mere technical laboratory report for your colleagues, explaining science, but a nourishing story of some phase of nature that will make scientific truth a living, spiritual possession of the world, you must see your problem in two aspects; first, as a problem of science, and, second, as a problem of art. I am very little interested in explaining the "wonders" of science to anybody. The emotion of wonder can be aroused with less effort in other ways. Taking rabbits out of a hat by sleight-of-hand arouses as much wonder in most people as shooting electrons out of atoms with alpha particles, or knocking genes out of germ-cells with X-rays.

In fact, I do not think it does people very much good to learn the marvels of the atom or the germ-cell unless at the same time they are taught how to make this knowledge helpful for solving their daily problems, inspiring for their hours of meditation, consoling in their days of grief, enlightening in their periods of doubt, heartening in their moments of fear, exalting in their times of triumph and success. You can look into an encyclopedia and find the discoveries of science quite fully and interestingly explained; I have no wish to explain science, but to make it live in the mind and heart of the world as I think it must have lived in the mind and heart of the imaginative geniuses who discovered, aye, indeed, created it.

I say "created" it; for we do not really *know* whether science is true or not. We do not really know whether the universe the scientist has revealed to us is the true universe or a universe of his own creation. May I be technical enough for a moment to say that I do not wish to become involved here in the mazes of Platonic or Kantian or neo-Kantian idealism? A number of scientists such as Lord Balfour, Arthur Eddington, J. B. S. Haldane and Joseph Needham have recently written brilliantly and profoundly on these problems. I am personally a pretty thoroughgoing empiricist, believing that whatever the real world may be, we can never know any but the world of our own experience. I merely wish to say here that for the "practical reason," the scientist has revealed to us the most usable, dependable, serviceable world that either his imagination or ours has been able to picture. It seems likewise to be the friendliest, the kindest, and, withal, the truest universe that has yet been found. And my wish is not to arouse wonder in you that the scientist has discovered such a world *for him to live in*, but, through the medium of what art I may command, to reveal it to you as a good world for *you also to live in*, to aid you to share that universe with him, and to participate, as he had to do in order to learn what he has learned, in its goodness, beauty and truth.

For the aim of science, art and religion is for ever the same, namely, to bring the mind into possession of the truth, goodness and beauty of the world; and just in so far as they succeed in doing this, they move the mind to an acceptance of life itself as something satisfying and tolerable. The notion that there can be any conflict among them, when it is only by working in harmony toward this common objective that life can reach its highest fulfillment, is absurd. Such a notion can enter only those small minds that have

seen but one side of life and but one side of the world. Speaking somewhat narrowly, it is the aim of science to find a universe that works, and the aim of art and religion, to find a universe that is significant. Science, for example, tells us the speed of light, the orbits of electrons and the mechanics of the germ-cell, but art and religion not only give these things meaning, they constitute their meaning. What a workable universe, the mechanics of which constitute science, means to you and me as personal individuals, constitutes art and religion.

Speaking, therefore, once more to those young men and women who may desire to write about science, you will not do so worthily unless you see what science means and what art and religion mean. A purely scientific universe would, no doubt, operate successfully; the supreme triumph of science is that it has proved that it does work successfully; but without art and religion, it has no warmth or love or music or color, no duty, no obligation, no morality, because these are personal and lie within us. Science can measure them, that is true; but it can not give them meaning.

If, therefore, you would speak to the common man about science, your function for the moment is not that of the scientist, but that of the artist and the religionist, and your aim is to teach him not only how the universe works, as science has revealed it, but how vastly better, truer and more beautiful such a universe is than any universe he could possibly discover or construct out of his ignorance, superstition and fear.

With such ultimate purposes as these, the practical mechanics of writing such a simple book as this may seem very humble indeed, and in fact they are. The work may seem very commonplace drudgery, and most of it is. The results may seem absurdly meager

to the artist they always seem so, for the artist never achieves his ideal. Indeed, the striving toward his ideal is itself the very ideal that he seeks. The artist gains his satisfaction from the process and the striving and must recognize, with Stevenson, that "to journey is better than to arrive." So these essays and interviews may not be art at all, yet they represent the happy journey of one who had art as his objective.

Going back to the mere mechanical methods of writing such a book as this, it may interest the reader, particularly one who aspires to scientific journalism, for me to say that all these interviews were taken down by a high-speed shorthand writer or stenotypist. It would seem then that all there was to do was merely to transcribe and print them. Far from it. *This only furnishes the material from which to work.* In order to write a scientific interview that shall be also an interpretation, you should first read all the scientist has ever said or written. This is necessary in order that you may ask intelligent questions to guide his thoughts toward the themes you have in mind. He has probably given no special thought to the kind of presentation of his material that you desire to make.

Some of these interviews covered in their original form more than one hundred fifty pages of manuscript, and no man talks in the style of a finished essay. My aim always in talking with a scientist is to make him forget that what he is saying is going to be published. The moment this occurs to him he is likely to become either stilted or commonplace, or else obscurely exact and technical. He begins at once to talk not to the common man, which my entire purpose is to induce him to do, but to his fellow scientists. It is quite easy to detect the difference.

After taking down an interview, it must be studied from the beginning to the end *as a whole*, something that it is impossible during the conversation for either the scientist or the interviewer to keep in mind. You must study it from beginning to end with a view to fixing in your own mind its literary values, for these are always numerous in the daily talk of the commonest person, and much more so in the animated free conversation of a great scientist talking about his own work. But these values must be arranged in sequence, and that sequence must have in the first place, scientific logic, and, so far as the writer is capable, artistic consistency and development as well.

When you come finally to write, in addition to the interview itself which lies before you, but which you must have grasped as a whole, you must have clearly in memory also as many as possible of the passages from the scientist's writings or addresses that bear upon the themes discussed. In your conversation with him, he may have forgotten these himself. Sometimes, not often, of course, it happens that in some remark he made ten or twenty years ago, you find the journalistic theme around which to build his discourse. Very frequently, too, after visiting with a scientist for a day or two, it is the remark he makes when he bids you good-by at his laboratory door, or at the eighteenth hole, or at the railroad depot, that gives you the central literary expression that imparts unity to all he has said. You perhaps write it on the back of an envelope when you get on the train, and, from that moment through all the week or two weeks or three weeks that you later spend in solidifying and unifying his conversation, this remains the end toward which your thinking trends.

At last, when you have the first copy of your interpretation finished, you, of course, submit it to the

scientist for his corrections and suggestions. Frequently these are invaluable, because your interpretation brings to his mind for the first time your purpose as a whole. You may as a result work it over completely and submit it to him again. In the end by your mutual labors both he and you find that you have said *what* he said, and you have not said anything that he did not say. You have used precisely the material he gave you for the purpose, but if you are successful in your aim, you have, out of those materials, *without changing them*, produced a simple, logical, animated discourse that reveals in a new way his personality and work, and something that has in it a little, at least, of the thing we call art. You have also thus by your combined efforts made a new contribution to popular science that never otherwise would or could have been made.

As the net result, if these interviews prove to be stimulating and instructive to the reader, and help to imbue his life with new issues, purposes and hopes, it has richly repaid the writer, because it means that he has succeeded in conveying to the reader the very thing that the scientists conveyed to him, the thing that they entrusted to him to give to the world.

Of course the reader should understand that the length of the contributions and their position in the volume have no relationship whatsoever to the relative importance and scientific distinction of the contributors.

Naturally, my gratitude is very great, and my thanks are very genuine, to all the scientists who have so generously given me of their time and thought, and cooperated so heartily in the preparation of this volume. It is a source of pride and pleasure to feel that I number them all among my personal friends. All the interviews have received their written approv-

al, often accompanied by very kindly expressions, which I cherish among my richest possessions.

Parts of a few of these interviews have been published in magazine form and some have brought me thousands of letters. All the interviews are, however, revised and greatly enlarged for book publication. My thanks are due to *The American Magazine*, the *World's Work*, *Good Housekeeping* and *Collier's Weekly*, for permission to use whatever parts of the interviews have been published in these magazines.

It is a pleasure to add that without the expert and continuous assistance of Mrs. Wiggam, her extensive readings in technical journals, her many, many hours of patient reading aloud when my eyes would not permit me to read; without her discovery of many valuable references and reseaches that otherwise would have wholly escaped me, and which have been of the most direct value, the book would have been impossible.

I should express my thanks also, to the many readers of my former books, who have generously written me of their helpfulness. Owing to the enormous assistance I have received from the scientists represented I have every reason to hope that this book will prove more helpful and stimulating than those in which I have expressed exclusively my own thoughts and opinions.

ALBERT EDWARD WIGGAM

CHAPTER II

YOUR MIND

WHAT IT IS—HOW IT WORKS SOME PRESENT-DAY THEORIES

MORE than twenty-five books and two hundred ninety-six researches and publications in a period of less than thirty years, all the product of one man. What a man and what a record! What a prophecy too, for Edward Lee Thorndike, whose interview opens this book, is now only fifty-four years old, and his momentum seems to increase rather than diminish.

He was born in Williamsburg, Massachusetts, in 1874, and graduated from Wesleyan in 1895 where, according to Cattell, his tennis service as well as his genius are still traditions. In 1896 and 1897, he studied under James, Royce, Palmer and Münsterberg at Harvard and received his Doctor's Degree at Columbia University in 1898, presenting a research which established the study of animal behavior on a quantitative and experimental basis as a definite branch of psychology. On February 19, 1901, he became professor of education in Teachers' College, Columbia University, and in 1925 he received the Butler medal in gold, which is awarded every five years "for the most distinguished contribution made anywhere in the world to philosophy or to educational theory, practice, or administration." A great celebration in his honor was given at Teachers' College on the twenty-fifth anniversary of his becoming professor of education in that institution, attended by scientists of distinction from many lands. On this occasion, Dr. J. McKeen Cattell voiced what must have been the assured conviction of them all: "It is impossible to write the history of education or of psychology without giving prominence to Thorndike's name."

II

WHEN Barnum said, "People like to be humbugged," he was both a psychologist and a prophet. He was a psychologist in that his uncanny discernment penetrated some of the most obscure motives that animate the human mind; he was a prophet in that humbuggery has grown from being the occupation of amateurs in his day into one of the most dignified and remunerative of the learned professions.

Humbuggery has certainly come into its own in the field of psychology and has devised means for both locating and deceiving its victims that would have excited Barnum's unqualified admiration and esteem. When the great showman further said, "A sucker is born every minute," he underestimated the output. He may have been correct as to the gross birth-rate, but he made his estimate before "gold brick psychology," had been invented as a new means for pleasantly, entertainingly and painlessly ensnaring these succulent members of the human species. This pseudo-science has provided a new form of bait that attracts far more of them than have ever been discovered before. It actually collects them in schools and shoals, and the most of them swallow hook, line, sinker and all. Where the bait can not be dangled before them in person, it is sent out by correspondence, even by air mail, so that the number of people who are born with an especial desire to be humbugged and with special talent for this form of mental and emotional exercise are now, as never before, provided with abundant facilities both for satisfying their tastes and advertising their whereabouts.

It is a wonder to me that such persons do not at least take the financial precaution to look into some high-school or college text-book and find what sort of psychology is being taught by responsible educators to the young men and women of the land. As a friend of mine said to me recently, "If you want to become wise, read text-books." I think he is right, because the school text-books of every age and every land, from Solomon's Proverbs down to Jones' Biology, Smith's Psychology and Brown's Arithmetic, have sought to preserve and hand on to the youth of the land the most advanced knowledge of the age.

This same friend who advised me to read text-books in order to become wise, has been making a partial survey of high-school and college text-books in a number of lines of science in order to determine who among our living scientists are quoted the most extensively. He believes that in this way he can determine something as to the relative importance of their contributions to the fundamental advances in their own fields. His survey is only partly completed, but he has already discovered that both in books of general science and in text-books on psychology, especially educational psychology, Prof. Edward L. Thorndike, of Columbia University, ranks in the very topmost group.

Any one at all acquainted with the history of the psychological sciences during the past generation would expect this to be true. However, some of Professor Thorndike's books, just because they do contain so much truth, are not very easy for the layman to read. Indeed, the majority of books on science that are easy to read do not contain much that is worth reading. Since, therefore, so many people do not have the time or inclination to take the special training essential to a full understanding of the more technical

problems of psychology, I fear that a great many of them who ought to read Professor Thorndike's profound and inspiring books will never do so. For that reason, I recently arranged to spend an afternoon with him in his laboratory, discussing in a non-technical way a number of these fascinating problems of the human mind.

I know of no one who can talk and lecture with greater simplicity and clarity, and with a greater wealth of every-day illustrations about psychology, than can Professor Thorndike. I also know of no scientist in any field who has a deeper appreciation of the need of the every-day man to gain an understanding of the truths that science has discovered.

A thing of interest that Professor Thorndike pointed out to me was that so many business and professional men are reading very advanced books on psychology, particularly books on the psychology of business, advertising and the selection of employees. He regarded it as a very hopeful sign that many business men are becoming better psychologists, by reading the more serious books in this field.

Along this line I should urge every intelligent person to read Professor Thorndike's latest book, entitled, *Adult Learning*. There is not much of it that is technical and the conclusions he sets forth are very inspiring. He shows that it is never too late to begin and that if you want to learn a thing, *now* is the time to learn it, no matter whether you are fifteen or twenty-five or fifty. He completely explodes the notion that you can't teach an old dog new tricks; and he submits abundant evidence to prove that you can learn just about anything you want to at any time of life.

In our delightful conversation, I urged Professor Thorndike not to attempt to give me a systematic and precise logical development of any particular phase

of psychology. I asked him just to talk to me informally about some of the main things that psychologists are now doing and thinking about, and to give me an occasional side-glance toward probable future developments in psychology. If you happen to be one of the thousands of school-teachers, educators and college students throughout America, who know Professor Thorndike personally, and who have come under his inspiring influence, I am sure you would have expected him to plunge at once into the middle of some extremely interesting and important psychological problem; and this is precisely what he did.

"I wonder if you ever thought about improving human language?" Professor Thorndike began.

I assured him that no such startling and original idea had ever entered my head.

"Well," he continued, "it is extraordinary that our physical tools and machines for handling material objects, our means of travel and communication, and the like, have made such wonderful progress and yet our social tools such as language and gesture, or things such as tact, or methods of approaching people and getting along with others, or of managing men in business, or of teaching children in school, have made very little progress. Some of these things have made practically no progress at all. Here, for example, is language, the one instrument that we probably use more than any other, the instrument that man has probably used longer than any other, perhaps for millions of years, and yet we have scarcely made any effort to improve it. We talk on the telephone half-way round the world, but the language that we use to convey our thoughts over the telephone has not improved in efficiency and economy since the days of Aristotle, or perhaps Moses, for all I know."

"Do you think," I inquired, "that psychology

might in the course of time improve our language so that we could express our thoughts with greater speed, precision and clarity, and with a greater economy of effort?"

"Well, it would seem that we ought to do something by studying the psychology of language to improve it as a vehicle for communicating our ideas just as we invent and improve telephones and printing-presses and phonographs and things of that kind. There isn't much to tell simply because we haven't done anything about it. The general point I wish to make is that whereas everybody is keen to improve a bicycle or a typewriter or a fountain pen or a plow, probably nobody ever before in your very varied life proposed to you that we should improve language and perhaps could do it if we tried. Anything that psychology can do to increase economy of time and effort in learning things is more important now than ever before in this age of speed when we are trying to teach everybody how to make himself the most effective, and how to make the most of the enormous number of tools and personal contacts that he meets with in our modern environment. It is said that the introduction of radio alone has brought over a thousand new words into our language. We certainly have to learn for the conduct of an intelligent life to-day at least twice as many words as were necessary in Shakespeare's time; language is always becoming harder both by reason of the new technical materials and inventions of our time and by the many foreign things that are brought to us through our present-day contacts with the whole world. As a consequence psychology should aid us to make language and spelling as easy to learn as possible, because we use language as the chief means for expressing our mental life. At the present time our schools, for example, teach the average child

to spell about four or five thousand words by the end of the eighth grade. They find that is the best they can do; but I think methods might be devised that would do far better than that, possibly twice as well. And to know how to use a large number of words is a great advantage all through life."

At this point, I said to Professor Thorndike, "You have so far been speaking of improving our main vehicle of thought, language, and thus expressing our ideas better, using our minds more effectively. Could you next give my readers a few of the newer conceptions of what ideas are, what the word *intelligence* or *intellect* means, and how some of you present-day psychologists conceive that intelligence probably operates. I realize that to do this without causing misunderstanding is extremely difficult, unless the reader is willing to undertake considerable mental labor to master your technical methods of investigation. First of all, may I ask what is your conception of the difference between animal mind and human mind. As every psychologist knows, you long ago did very important work on this problem."

"To begin a little way back," replied Professor Thorndike, "up to forty years ago people generally thought of the lower animals as having minds that were merely rather poor human minds. They believed that animals do not reason as often as we do, but that they do reason once in a while; and they would tell you interesting stories about dogs, horses, cats and the like that they believed proved their case.

"About thirty years ago we carried out some experiments on animals that led us to a somewhat different point of view. It appeared from our experiments that animals learned by what we call trial and success. By that we mean that they merely fumbled around and learned to do a thing just as we would

learn an act of physical or motor skill, such as singing a true note, or getting just the right amount of force in a tennis or golf stroke. That doctrine, for which I was responsible, held the field for quite a while, namely, that the learning of most of the animals was like our learning of acts of skill by trial, error and success. Our experiments indicated that when the animal in fumbling around chanced to lift a door latch or turn a button and the door opened and he thus obtained some reward such as food outside his cage, he was pleased; this satisfaction it appeared tended to stamp the connection so that the next time he fumbled a shorter time to achieve the reward, until finally he would do the task almost instantly.

“Later we experimented with some of the monkeys, and these experiments have been greatly elaborated and extended by such students as Kohler and Yerkes in recent years. These experiments seemed to show that apes learn by having ideas about things, that is, as we say, by putting two and two together; at least their minds seemed to work in a semi-logical way with ideas, rather than by a mere trial of a lot of random movements and a selection from these movements of the ones that proved profitable. The monkeys, especially the higher apes, such as the chimpanzee and gorilla, are our nearest relatives in mind as well as in body.

“The most interesting thing about these acts of intelligence is that they seem to be very specialized. For example, a chimpanzee will learn to do all sorts of things with a *stick*. If you hang a banana up beyond his reach or place it outside his cage, he will pick up a stick and knock it down or poke at it until he gets it within his reach. In extreme cases, he may take a hollow stick and push it inside another hollow stick to make it longer. However, when it comes to a

slightly different operation, such as piling boxes one on top of another so as to reach something, that may be exceedingly hard for him. Even the chimpanzee has the greatest difficulty in learning to put one box on top of another, so as to climb up and get something he wants. Give him a stick and he will reach up and knock the object, or give him one box and he will get up on it; but give him two boxes and it is very hard for him to learn to put the second box on top of the first one.

“The big question that emerges here is this: Is not the ability to learn things in both animals and man, which, for the moment, we may tentatively speak of as intelligence, very much more specialized than anybody ever thought? For instance, a dog is extremely clever in learning things about the *position* of objects, how to dodge things and the like. When he is chasing a rabbit and comes to a fence, he thinks out, so to speak, a way of getting around it just about as well as you or I. He has the dog logic that enables him to handle the problem of the position of an interfering object in space; as we say nowadays, he responds to that kind of a situation quickly and adequately; but, let the task be one of opening a gate to get through the fence, where, it may be, all he has to do is to perform one simple movement such as raising a bar, well, that is a very, very hard task for him. He learns that kind of a thing slowly and seems to learn it by the try-try-again method. Dog logic doesn't seem to be equal to that kind of a problem; his intelligence, or whatever we may call it, just doesn't seem to see through it.

“Now, continuing the same question, isn't intelligence in man very much the same sort of thing? First, do we not learn some things by the try-try-again method, and some other things by the putting-two-and-

two-together method, that is, by working with ideas? Secondly, are not our minds made up of an enormous number of highly specialized capacities to operate with particular kinds of materials and solve particular kinds of problems and situations? That is, have we a mind with a capital *M* that can operate with any kind of material, and on any kind of problem, or shall we think of an individual as having a great many specialized, highly unique, and particular capacities or abilities to do particular things, to comprehend, to see through and utilize particular means for particular ends?

“This does not quite adequately state the problem, but it brings forward the conception that one mind, whether in animal or man, may have very good control of operating with sticks, and very poor control with other things. It may be that our controls are specialized so that one man, for example, is very good with words and symbols; another person doesn’t do well with words, doesn’t get much out of books,—you do not learn much when you talk to him, and yet, when he is in an actual social situation with other people, he may know better than the fellow with great word capacity whom to trust, whom to obey, whether the person he is selecting for employment is likely to succeed or not, whether to press a matter strongly with another person, or, as we say, to ‘handle him with gloves,’ and things of that kind. It may be that there is a big split between the kind of intelligence that can draw correct and profitable inferences from other people’s facial expressions, the tones of their voices, and their general way of acting, and the kind of intelligence that operates successfully with words. These are samples of the many different kinds of intelligence that there may be in both animals and man.”

“Then you believe that a man probably has a great

many intelligences, each one good for dealing with certain kinds of objects, situations and ideas, instead of having just one general-purpose intelligence good for every occasion?" I said.

"I do not mean there would be a clean-cut division among them; no doubt there would be a great deal of overlapping and interrelation. We have no idea to what degree they may be separated, but it strikes me more and more that at least in the animal kingdom there is a very great deal of this specialization. It would seem natural, for instance, that monkeys, having always lived in the woods, would tend to build up special operative power with sticks and things of that sort. The monkeys that had this kind of mental control over their life situations, it would seem, would have an advantage over monkeys deficient in this respect, and would thus tend to survive and hand on this intelligence as a characteristic of the species.

"If such a conception of intelligence as being adapted for special things rather than a general intelligence adapted for everything were definitely established it would be a matter of a good deal of practical importance. This is because all our doctrines about politics, education and welfare work, business management and the like, assume that a person has a mind that thinks in a general way about things. That may be true, but I think the evidence is increasing that intellect is always conditioned by the material and situation with which it has to operate."

"I remember," I said, "that some time ago you wrote a paper in which you suggested that perhaps men had at least three fairly distinct types of intelligence to which you gave the names, 'mechanical intelligence,' 'social intelligence' and 'abstract intelligence.' I was wondering the other day if there might not also be even other kinds."

"I think that may very well be the case but I could not prove it. I think, for example, that among people who are extremely competent in book learning and who score very high on intelligence tests with words and numbers, I could find some who would score below the average in managing people, getting on with them, appreciating them and working with them. Such persons, I think, would be high in abstract intelligence, and low in social intelligence. I think we could find others who are high in either abstract or social intelligence, or in both, yet, if you put them to work with a complicated machine they would break it to pieces in a short time; or if you asked them to assemble the parts of an intricate machine, they just could not do it. I think we should be justified in saying that such persons are low in mechanical intelligence. It would be only an extension of the argument to suppose that there could also be a specialized ability with color and form."

"Well, there is an inquiry I have been wanting to make while you were speaking of the different kinds of intelligence," I said, "and that is, whether there is any opposition among them. For instance, if a man is high in abstract intelligence is he likely to be low in mechanical intelligence? If he is high in mechanical or artistic intelligence is he likely to be a dumb-head in arithmetic or language or fields that require abstract reasoning? In other words, is there anything to support the very popular theory, voiced in Emerson's *Essay on Compensation*, namely that nature compensates a great commander or musician by making him weak morally or physically, and the like? I recall that our popular humorous characters, "Mutt and Jeff," were arguing about Emerson's theory of compensation on one occasion when Jeff settled it to his satisfaction by saying that he had always

noticed that when one of a man's legs was too long, the other was always too short."

"I think your humorist would have a hard time proving that, in respect to either man's body or mind. Nature does not make up for stupidity by making a man tactful or make up for his lack of success in school by making him unusually successful in the shop. On the contrary, good characteristics are positively related to one another, all of them. The relationship is far from perfect but it is on the right side. Indeed, this is one of the most fortunate things in the world; great abilities in any one direction tend to go with general sagacity, with good will and also even with good health. When we have a man, for example, who has great scientific ability, he does not spend it in killing off his enemies or in making life unhappy for people whom he detests. I don't believe you could find a case in the world's history where an eminent scientific man has used his talents in that way. I don't mean that he sits down and says to himself, 'I will be an uplifter; I will make the world better; I will do what I can so that everybody will have more food and be happier. No, it isn't that, but at the same time, such a man does have general good will.

"We could go on indefinitely with this thought. Men who have great social or economic or military ability and who become powerful as rulers either in government or in the counting-room do not often try to make people miserable. There have been some bad persons of this kind, but on the whole men of great power would rather see people happy than unhappy, and they have a general good intent toward others. There have been a few exceptions in history, but only a few; there have been some cases of people of great ability who were queer, fantastic, cranky, even insane; but they have been very rare.

“On the whole, then, we may say that every investigation in psychology has tended to support the conclusion that the desirable things in men tend to be linked together. A very able person usually has common sense, gets on with other folk, and his talents work for human benefit instead of against it. Indeed, we can go so far as to say that if you were picking a man for some special talent, some particular kind of a job, and you had no other way of determining his special fitness, your best way would be to select the man who had the most general ability, and you would very likely get a large measure of the special talent that you desired. If you wanted to secure a minister to Mexico who had special ability in getting along with people, your best bet might be to select a man who had demonstrated high general powers of mind.

“We depend upon this fact of human nature all the time in college education. We select young men for entrance to college chiefly for book-learning. We want out of college men in the end doctors, lawyers, leaders in business, government and the professions. No doubt, we lose a few good people who could become able lawyers, clergymen, doctors and engineers; but we don’t lose very many, because in the long run the young man who is going to become a good pastor and cure sick souls will have a pretty good intellect for book-learning, too. In the long run the man who is going to be a good engineer and build railroads and bridges will have a pretty good intellect for book-learning.”

CHAPTER III

YOUR MIND

WHAT IT IS—HOW IT WORKS

SOME PRESENT-DAY THEORIES (*Continued*)

III

AT THIS point in my long talk with Professor Thorndike. I said, "Since, then, you say that the intelligence, or intelligences of men are probably rather split up and, it may be, almost infinitely specialized, does that mean that there is a special nerve or brain center that presides over each separate talent, or ability, or intelligence, or whatever you may call these special operative controls? In fact, what is the general status of the old theory that we have a speech center, an arithmetic center, a music center, a memory center, and a lot of other centers in the brain that carry on, each its own special phase of mental activity?"

"That theory is not at present in good standing among psychologists. In fact, we know very little about what happens when we think or learn. The organization of the brain that parallels the organization of intelligence is probably extremely complicated. We know very little about the brain activities that correspond to intelligence or to learning. For example, we do not know what it is that repeating a thing over and over again does to us or to our minds. Suppose you are learning French; you say over and over a French word and the English word that corresponds to it, and by and by one word calls up the other word, and you say you have learned what the French word means. We know very little about what has been going on in your mind or brain to bring about that result. Some would say that mere repetition is the main thing in learning, while others would say that being interested is the main thing.

"In fact, if you should ask twenty-five of your

friends who had good general judgment how much longer it took them to learn something they did not care about at all than something that vitally concerned them, some of them would say they just could not learn anything unless it concerned them. They would maintain that if you told them something in which they were not interested a hundred times, it would 'go in one ear and out the other'; they would forget it just as fast as it was told them. Others would say that it was mostly repetition that enabled them to learn things; that if you just said often enough 'Murphy's soap is the best soap, Murphy's soap is the best soap,' they would come in time to have that idea whether they had any interest in Murphy's soap or not.

"A group of untrained persons of good judgment would vary enormously in their opinion on this point; a group of trained psychologists would also vary widely, although not quite so widely. If you should ask me, my answer would have to be very much qualified. On the one hand, I could think of instances where a certain thing was repeated again, and again, and again, but somehow the mind didn't seem to tolerate it and cast it forth as fast as it came in; but I can think of other cases where, by mere dint of saying and doing things together time and again, they seem to be fixed together firmly in the mental life. But just what repetition does and just what interest does, we do not know. Still less do we know what happens in the brain when we learn.

"There have been two American experimenters, Dr. S. I. Franz, and, later, Dr. Carl Spencer Lashley, who have done important work upon this problem.

"There are only a few persons in this country equipped to do that kind of work. In order to do it, you have to learn biological and anatomical, as well

as psychological, techniques—two or three trades, so to speak.

“Doctor Franz taught animals to do certain tricks, and then took out parts of their brains. The animals were then unable to do these tricks, but they could recover the ability when they were taught again. He also trained persons who had been paralyzed in some part or limb, by accident or disease, to use the part that had lost its function. All this seemed to indicate that some other part of the brain, or it may be, the entire remaining part of the brain took charge and carried out the function.

“Lashley has shown, by taking out various parts of the brain cortex of a rat, that, roughly, there is no particular part of its cortex that is needed to learn any particular thing. You can cut out almost any part of it and he can still learn. If you cut out too much of it, this hinders him in learning. As I understand Lashley, he would probably say that almost the whole cortex of your brain may be active in the very simplest tasks that you perform. If you say to yourself, ‘It is noon, and I will go home for luncheon,’ and you then get your hat and coat, I think Lashley would regard it as more likely that ninety per cent. of your brain is active in that simple procedure than that only one per cent. is active.

“The older notion of an impulse, say from the sight of the clock hands at twelve, coming into the brain and going along a little track and causing another impulse to pass along a track out from the brain and cause the muscles of your arm to reach for your hat is too simple to account for the facts. Apparently there has to be some general control of the whole machine for any part of it to act properly.

“That makes the mind almost incredibly complicated. Think of it! There are some three thousand

million units in the brain, that is, three thousand million nerve-cells or neurones. These neurones are little strings frayed out at the ends, which conduct some form of activity or excitement (perhaps such as occurs in an electrical core conductor) from one end to the other, and then on to other neurones. These neurones are changed in some way by what happens to them. Lashley's experiments indicate that the whole mechanism, all the three thousand million units of the machine, may have a share in almost everything we do.

"I do not mean to say that the old theory of local brain action for particular mental functions is completely abandoned. Much of this experimentation has been with very simple animals, and some of the best neurologists are not yet convinced. You should read a book by C. J. Herrick, entitled *Brains of Rats and Men*; it is very interesting. Herrick defends the theory that the mind is a kind of telephone system, and has its local centers, exchanges, etc. Nor would Lashley necessarily deny this, but he would assert with reason that no simple telephone system can do the work. My own opinion is that localization plays some part. But I also think that the extent to which the simplest acts of our lives are under a general supervision all the time by the whole brain or the whole mind, is a thing of very great importance."

"If you modify in this way the old view of the localization of mental functions in different parts, how can you maintain that the mind is a mechanism?" I asked.

Doctor Thorndike replied promptly, "If a person believes that mental action is, in the last analysis, mechanical action, as some of us do, he ought to be a broad-gage enough mechanist to realize that the mind is a much more complicated mechanism than a telephone system or linotype machine, or a house with

a thousand keys and a thousand locks, or even a million keys and a million locks.

"I can very well see why intelligent people rebel against the notion that our mental life is like a series of blocks in which one block falls down and knocks over the next one, and that knocks over the next one, and that tips another one a little to this side or that. Anything like that is too absurdly simple to be a human mind. The mechanistic conception of mental life is a much broader, larger conception. It conceives that the mind is made up of habits, but not of habits simply put together in a bundle. On the contrary, there is a degree of organization, supervision and control that is almost beyond our power to imagine."

"Since you say that the conception of the mind as an infinitely organized and integrated, self-directing mechanism is now gaining ground, could you give me a little clearer idea as to its dynamics, how it probably works to produce the thing we call an idea, or a thought, or a movement? Here, for example, is an idiot, who, with the greatest difficulty can be taught to spell *c-a-t*, *cat*; then at the other end are Aristotle, Shakespeare and Newton. Is it merely a difference in *degree* of organization, integration and the like, or have the idiot and the genius different kinds of minds? Furthermore, when we have a simple thought, such as, 'I shall put on my hat,' or we develop a simple set of habits, such as turning a door-knob, and at another time we work out problems in higher mathematics or philosophy, is the latter due to something 'higher,' or to some different sort of process from the former? Or are all operations of the thing we call mind or intelligence due to the same fundamental causes and carried out by essentially the same nervous and physical processes?"

"I think," replied Professor Thorndike, "that the

idiot and Shakespeare have essentially the same kind of minds and that they think by the same kind of psychological mechanics; furthermore, that the higher mental processes of any individual are not different in their nature from the lower and simpler forms of mental activity.

"The orthodox view of the nature of intellect," he continued, "has been that it is divided rather sharply into a lower half and a higher half; the lower half has been conceived of as associating one idea, say an idea, *A*, with another idea, *B*, and these with a movement, *C*. This half has been thought of as being concerned chiefly with acquiring information and developing specialized habits. The higher half has been thought of as being characterized by abstraction, generalization, the perception and use of relations, and the selection and control of habits in inference or reasoning, and the ability to manage novel or original tasks.

"Furthermore, the orthodox view has been that this lower half depends upon a different fact, or set of facts, in nature from the higher half; it has regarded the lower half—the idea-connecting or habit-forming half—as being carried on by a physiological mechanism by which a stimulus to one neurone *A* is conducted to, and excites action in, neurones *B*, *C*, or *D*, rather than in any other neurones; but it has held that the higher processes such as reason and judgment depend on something quite different. There has been little effort to imagine or describe just what this 'something different,' is, but there has been much confidence that it is *not* the same mechanism as that by which we form simple habits, and by which we associate simple ideas with one another.

"The hypothesis that I have presented is that *quality* of intellect depends upon *quantity* of connections in the nervous system, including, of course,

chiefly the brain. This view asserts that in their deeper nature the highest forms of intellectual operation are carried on by mere association or connection-forming, which are identical in their nature with the lowest and simplest forms of intellectual operation. The only difference is that the higher forms of thinking merely have a *great many more* of these physiological connections than the lower forms, these connections being different only in number and not in nature. By the same argument, the person whose intellect is higher or better than that of another person (whether it be Aristotle compared with an idiot, or a good bricklayer compared with a poor one) differs from the poor one in having, not a new sort of physiological process, but simply a larger number of connections of the ordinary sort.

“To explain a little further, if we represent by the letter *c*, that fact or capacity of the nervous system whereby it tends to connect a stimulus *A* with some other idea or movement or situation *B*, then by this hypothesis, the ‘higher’ intellectual processes, such as writing a poem or measuring an eclipse, will differ from the lower processes, such as putting on your hat, or shaking hands with a friend, chiefly in the number of *c*’s involved. And, by the same line of reasoning, a great intellect will differ from a poor one chiefly by the fact that the great intellect possesses a larger number of *c*’s.

“Of course, the common-sense view, and, no doubt to some extent the correct one, is that a man’s power to respond correctly and profitably to certain stimuli and situations is a primary indication of the degree of his intellect. The hypothesis we are presenting here accepts this view, but makes a sharp distinction in this regard between the original intellectual capacity and the actual intellectual products.

“To illustrate this, the correctness of the judgments that you form about a thing will, of course, depend largely upon your information about it—that is, upon your experience and training. For example, a high-school boy to-day makes judgments about eclipses, or about lightning, or about the action of acids on metals that are far more correct than were the judgments of Aristotle or Moses about these things. This is because he knows more about them. Chemistry and physics have made such great advances that a rather foolish man to-day can make wiser judgments about a great many things than the very wisest man could make a thousand or five thousand years ago. But all this has not altered the fact that some men arrive at far wiser judgments about things than other men do when they have had the same opportunities to gain information about them. If Aristotle and Moses were schoolboys to-day in New York and were given the usual education of schoolboys here, they would surely far excel the average schoolboy in their ability to distinguish truth from error and wisdom from folly.

“We believe, therefore, that this hypothesis furnishes us with a better way of thinking about, and also a better way of approaching the problem of measuring a man’s original capacity, as distinguished from his original capacity *plus his training*, than previous hypotheses have furnished. To repeat, we conceive by it that if one man has an original tendency, apart from all experience and training, to be right rather than wrong in his judgments of men and things, to gain true rather than false ideas of business or engineering or politics, to make justifiable rather than unjustifiable inferences about life and nature, that this tendency, or set of tendencies, is due to his having by original nature more *c*’s than other men.

“There are two essential elements in, or aspects of, our hypothesis: the first is that it offers a purely *quantitative fact*, namely, the different number of *c*’s in each man’s constitutional make-up as the chief reason why men differ from one another in their original intellectual capacities; that is, in their abilities to distinguish truth from error, wisdom from folly, in so far as these differences are caused by their original natures. The second element, or aspect, of our hypothesis is that it offers the same *quantitative fact* namely, the number of *c*’s involved, as the cause of the *qualitative* differences between the lower, simpler, idea-connecting, habit-forming or associative mental processes and the higher reasoning, inferring and judging processes. We might sum up all the *c*’s that a man possesses and designate it as capital *C*. Thus, a man’s capital *C* would stand for his original physiological possibility for making connections among ideas. His big *C* would consist of little *c*’s, one little *c* meaning the possibility of forming one connection, two little *c*’s meaning the possibility of forming two connections, and so on. One man’s big *C* would thus be vastly more complex than another man’s big *C* because it would be made up of a vastly greater number of little *c*’s.

“There are many qualifications, amendments and explanations of this hypothesis needed to make it more exact. But if your impatient reader should not go into all these fine points and subtle distinctions, or should forget them, he will suffer no very great loss. The whole gist of our doctrine is that, by original nature, the intellect that is capable of the highest reason and adaptability differs from the intellect of an imbecile only in its capacity for having more connections or bonds among ideas or things or impulses or stimuli, or whatever you call them, that flow in

from the outside world. This would mean, as I have already stated in other ways, that if two men had exactly the same outside environments, the amount of intellect which each one would manifest, and the extent to which each one would manifest 'higher' powers or 'lower' powers than the other, would depend largely upon the number of little *c*'s that compose each one's big *C*.

"We have made efforts to verify this hypothesis by objective evidence. Dr. J. W. Tilton made a number of tests upon two hundred fifty boys at the time of their graduation from the eighth grade. He endeavored in various ways to test the higher mental processes and also the lower. The net result was that we found the higher and lower powers were due to the same fundamental causes in so far as these tests measure fundamental causes. We have also developed other evidence in support of this hypothesis."

"Well," I said, "I gather from all this, Professor Thorndike, that you regard intellect, or intelligence, or mental action, as being the same kind of natural phenomenon, the same sort of fact of nature, wherever it occurs and to whatever degree it is manifested, whether in animals or men."

"Yes, that is our general conclusion at the present time. Such a conception has one advantage that you may not have thought of. If we could succeed in measuring intelligence wherever it occurred, whether in men or in animals, it would enable us to construct a measuring scale beginning with zero intelligence and running on up to the highest genius. We have made some effort to do this. One difficulty of the problem has been to determine the zero on such a scale. After securing the opinions of a considerable group of trained psychologists we concluded that an animal that had just barely enough intelligence to tell bitter

from sweet would have approximately zero intelligence. Common earthworms have more intelligence than that. I should not be surprised if a machine could be made that would take certain sweet substances and spew out certain bitter ones. I think, therefore, that you may call this very close to zero intelligence. If we call the difficulty of the intellectual tasks which only a genius can perform 100, the figures for a cat, a chimpanzee, or a very, very stupid man, and an average man would be about 20, 30, 50, and 80 respectively.

"These estimates are from very imperfect knowledge. I hope some day all these grades of intelligence all the way from the genius down to the oyster or the earthworm will be determined by experiment. We could then report the height of a man's intellect as we can now report the height of a man's body. This would have a great many practical advantages."

"Since you have given us," I said, "your general conception of the nature of intelligence, may I inquire if you regard the intelligence of each individual, that is, the total mind of each individual, as being always bound together in one absolutely unified and integrated thing, which we may term his personality? We hear a good deal of talk nowadays about 'double personalities,' 'dissociated personalities' and the like. You have already greatly illuminated this problem in discussing the different kinds of intelligence and the general operative control that the entire nervous mechanism seems at all times to carry on; but I wish you might say a few words further as to the bearing this may have on such problems as hysterias, insanities and other abnormal mental conditions."

"The concept of dissociation, the idea of a part of the mind or nervous system getting off loose from the rest and acting like a miniature personality all by

itself," Professor Thorndike replied, "is very instructive, at least as a conception.

"With certain people something like this seems to happen. Suppose that I am sitting here doing my work, or chatting with you, and my right arm reaches out and picks up a book and throws it across the room or out the window. I didn't intend to throw it; I didn't have any desire, so far as I was consciously aware, to throw it. Edward L. Thorndike, as a total person, did not wish or will or instigate it. If I should do such a thing as that (and some people do many such things), it might be explained as the action of a dissociated state. That is, a certain part of you from time to time takes control of you or a part of you and gives you a stomachache, or a headache, or makes your eyes twitch, or makes you have a dreadful feeling of fear, or paralyzes your arm, or blinds you. Such things seem really to take place in some people, and this is instructive in helping us to see that none of us is perfectly unified and integrated.

"Parts of us, at times, do things that we as total personalities do not countenance. No one of us is always absolutely tied together into one unit of management. These facts are true about every one. When they become extreme, especially when they take troublesome or destructive turns, we term them insanities, hysterias, dissociated personalities and the like.

"A famous French psychologist, Janet, made important studies of facts of this sort. Morton Prince, in this country, has written fascinating books about them. Freud has used them as the starting-point for his extraordinary theories about human nature in general. Many psychologists think that he misinterprets the facts. The general conception, however, that there are various degrees of association and dissociation in the human personality, various degrees of

unification and looseness, resulting in unattached conditions of greater or lesser degree, is very important, whether Freud's particular views about it or his particular ways of treatment are right or wrong, or whether the thing is as important in ordinary life as he contends it is. The disorganization of the mind, I should add, is not the same as the specialization we were speaking of. A mind may be highly specialized and yet well organized and under good control."

At this point I asked Professor Thorndike if he would give my readers a few glimpses of some of the main lines of development in psychology that seem to be ahead of us and which will likely receive especial attention during the next ten or twenty years. I said, "I have recently visited two or three universities to see what was going on in devising scales for rating people's personal traits by getting a number of people to judge their traits and estimate them in great detail; I had quite a talk with Lashley also about his work on the brains of rats, and spent a couple of days with Doctor Franz, out at Los Angeles; I also observed the work that Dr. Lee Travis is doing at the University of Iowa; I also hear of work going on to determine chemical and physiological changes that take place as a result of emotions and mental activities and the like: Are these developments important?"

"Oh, yes, they are highly important, and they are very promising. One reason why all these lines of work are so promising as compared with even the same amount of labor that may have been going on in psychology, say twenty years ago, is that they are proceeding by purely experimental methods, involving the use of anatomical, physiological, chemical and mechanical techniques, as well as statistical instruments of great refinement, that are far beyond the

old armchair, speculative, introspective methods of exploring the mind.

"All sorts of interesting things will be discovered, I am sure, year by year. The new sciences of biophysics and bio-chemistry will study the actual behavior of the brain-cells and neurones. Biologists will extend the work of Loeb, Jennings and others in observing the behavior of single-celled animals and thus throw light on the behavior of the neurones, which are, in a sense, single-celled animals living together in a very specialized way. Some microscopist may find a way to observe directly the action of the neurones in some animals. We can experiment with the animals as we can not with men and women. For example, the psychologist, Doctor Hollingworth, suggests that we should subject animals to shocks and see whether they go insane.

"Work such as that of Franz and Lashley leads out into many lines, all of great promise. A knowledge of the commonest facts of mental life, attention, learning, memory, habit and the like will yield rich returns to genius and industry."

"Will you say a few words about the applications of psychology? Does psychology have a parallel in human engineering as physics does in mechanical engineering?"

"Psychology is of help in vocational guidance, in selecting men and women for employment and in aiding young people with advice about their future careers. Dr. W. V. Bingham, now president of the Psychological Corporation of New York, could tell you a lot about that. Psychology is also helping very greatly in classifying children in schools. Physicians are becoming trained in psychology, and they find it an aid with many patients. Social workers are now often trained in psychology so that they may appreciate and

relieve the mental troubles of the poor and distressed as well as their purely physical troubles. They are finding it important to minister to diseased and troubled minds as well as to supply food and clothing to destitute and ailing bodies.

“Psychology is being used in constructing text-books so that children can learn out of them better than they used to and with less strain. Thirty years ago the most progressive educators constructed text-books with little thought about building them upon psychological principles of learning; to-day few progressive educators would think of writing text-books for children in the schools without seriously considering psychology. If anybody had proposed thirty years ago that the United States Civil Service Commission should employ a psychologist, I think it would have been regarded as a freak proposal. To-day it has a psychologist, a very competent one, who has, for five years or more, aided the Commission in selecting men and women for government employ.

“Still I do not think that these practical applications of psychology are as important as the discovery of the fundamental laws of the mind. The application of psychology to life will be comparatively easy and rapid when we once learn exactly how habits are formed, exactly how individuals differ from one another, exactly what mental activity is and the like. When we have in our hands the laws of mental life we can apply them with as much certainty of success as the chemist and physicist now have in applying the laws of matter. We know far more about the constitution of atoms and the causes of the movement of the stars than we know about the constitution of our own minds and the causes of our own acts. But the psychologist has at least set before himself the ideal of building a science of human nature upon which

education, economics, government and religion may rely just as safely as the engineer relies on physics in building bridges or constructing aeroplanes. If you take Solomon's Book of Proverbs as an example of ancient psychology, and compare it with a modern book of psychology, you will see that we have made some progress. The advance may seem small as compared with the advance from the architecture of Solomon's Temple to the sky-scraper of to-day; but it is enough to give us the courage to keep on trying. Our ideal of a science of human nature which shall be as true and fundamental as the sciences of physics and chemistry is as yet far away, but not a year goes by that we do not make some progress toward that ideal."

CHAPTER IV

HOW TO MAKE AN INVENTORY OF YOUR PERSONALITY

WHEN Donald A. Laird, present head of the departments of psychology and education at Colgate University, at Hamilton, New York, was an undergraduate at the University of Dubuque, Iowa, the late Wilhelm Knuth, psychologist, said to him: "Here are some shelves of apparatus, and at the north end of the library you will find some books on psychology. Do something!" From that day, Laird has been an enthusiastic student of psychology and is now one of the most productive of the younger psychologists of the country. He was born in Indiana in 1898, and received his collegiate degree at the University of Dubuque, in 1919, and his Doctor's Degree at the University of Iowa, in 1923. After graduation he was engaged in psychiatric work with the sailors. This, together with a year's experience in the State Hospital for the Insane at Independence, Iowa, turned Laird's attention to the problems of adjusting the average person happily to his work and to industrial psychology in general. After the war, the National Research Council gave him a year of study and experimentation. Although Doctor Laird is scarcely thirty, he has written three important books, published more than one hundred fifty magazine and technical articles, and has founded and is editor of a monthly magazine of his own, entitled *Industrial Psychology*. In the following interview, he talks with characteristic enthusiasm about how to tell whether you are an introvert or an extrovert, and in a genial but scientific spirit tells you a great deal about, "how you get that way."

IV

Two men of equal intelligence do the same sort of work. One of them likes it and succeeds, the other dislikes it and fails.

What is the difference?

Every summer thousands of college students go out selling something to make their next year's expenses. They all have about equal intelligence. They sell everything from magazine subscriptions, Bibles and Shakespeare to aluminum skillets and teakettles. Some of these boys make a good round sum of money and have the time of their lives. Some of them have to yank themselves up by the nape of the neck and screw up their courage every time they knock at a door; and in the end they fail miserably, and come home discouraged and without money.

Again, what is the difference?

It is not a lack of intelligence nor a difference in intelligence. They all have plenty of brains to sell either Bibles or frying pans.

At Colgate University, Dr. Donald A. Laird and his students have begun to find out what the difference is, and have discovered to some extent how to measure that difference. To-day men can be told pretty well in advance the jobs they are almost certain to fail at, and at least be given a pretty strong indication as to the jobs at which they will probably succeed.

For some time I had been reading in technical journals about the Colgate Emotional Hygiene Tests which had been devised by Dr. Donald A. Laird, psychologist of Colgate University, at Hamilton, New York. I had also heard of their practical success in

some of the big industrial plants of the country, and knew they were being used to test the emotional attitudes of college students in numerous colleges and universities from Maine to California. From the importance and scope of these investigations I had gathered that their inventor must be a man of some fifty or sixty years of age.

Imagine my surprise when, calling on him in his laboratory to find out about these tests, I found a young man apparently about thirty years old. He was surrounded by a group of enthusiastic students, and for the moment I was not sure which was the professor and which the students, as they all seemed to be about the same age.

In line with his energy and decision on other matters, Doctor Laird chose his wife and married her when he was a sophomore in college at the age of eighteen. While he was conducting psychological examinations in the Navy during the war, he saw to it that his wife worked at the same station, by the simple expedient of not telling Uncle Sam that they were married.

"What would you advise a man to do first," I asked Doctor Laird, "who wanted to make the most of himself and his opportunities?"

"The first thing any man should do," he replied, "is to ask himself two important questions, either about the job he is going to choose for his life-work or the job he is in now.

"(1) How well does this job allow me to express the traits and characteristics which are my traits and characteristics.

"(2) Does this job make me *repress* my natural likes and dislikes, or does it allow me to *express* them?

"Even if a man is a dumb-head and likes his work, he is a personal success. And if he is a genius and is

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in a job that does not fit his emotional make-up, while he may have to stick it out from force of circumstances, he may not be a personal failure, yet he has missed his chance of real life and self-realization. What a man wants is a job that gives him not fifty per cent. or seventy-five per cent., but one hundred per cent. *self-realization*. The difference between two men of equal intelligence doing the same work, one of whom succeeds and the other fails is one of *emotional attitude*. The difference between the students who succeed and those who fail in selling aluminum ware, is that one group finds self-realization in the work and the other does not.

“My students and I—you must give a lot of credit to my students as they have done most of the work—have devised a battery of forty-eight tests that we call our ‘introversion-extroversion tests.’ These, we believe, give us a pretty good line on a man’s emotional make-up and personality. And we find a man’s emotional attitude toward his job and his general personality fitness for it as important as his mental capacity to do the work.

“A man who tests high in introversion, we call an ‘introvert,’ and one who tests high in extroversion, we call an ‘extrovert.’ Most of us, however, have a considerable number of the qualities of both introverts and extroverts, which fall into what we call the ‘ambiversion’ zone. This zone occupies a large area in our emotional make-up and personality. As a matter of fact, it is only when we lean away over toward the introvert or extrovert side of our make-up that these qualities stand out very definitely.

“Fundamentally, the introvert is a man of ideas and thought. His life and his satisfactions are mainly *inside* of himself. On the other hand, the extrovert finds his life and satisfactions *outside* of himself,

loves to meet people, to build, to promote and manage.

"Our great typical extrovert was Colonel Roosevelt. A great typical introvert was President Wilson. Of course each had some qualities of the opposite type, but these terms introversion and extroversion describe the main trends of each man's personality. Think for a moment how different they were in physical make-up and bodily proportion! I have little belief in what is commonly called 'character analysis,' but I am convinced that we have found a certain relationship between body form and bulk when taken in their relationship to the length of the limbs that gives us a hunch at least as to whether a man, especially a man who is under twenty-five, is an introvert or extrovert. However, I will tell you more about that later.

"While our complete introversion-extroversion examination covers forty-eight questions, I believe I can give you a good idea of how to score yourself on them and what the questions really signify, by discussing some twenty sample questions in detail. For instance, if you answer eleven of these questions with a yes, you tend moderately toward introversion. If you answer thirteen of them with a yes, it shows you tend rather strongly toward introversion; and the chances are three to one that you would not make a good salesman or a good foreman. Of course, you might pull through; many introverts do pull through as salesmen or as executives, but they are never really happy at their jobs. These are not the jobs that give introverts one hundred per cent. self-realization.

"If, on the other hand, you answer thirteen of these questions with a no, you are undoubtedly a decided extrovert, and the chances are three to one that you will not make a real success as a college student. I mean by that, that among those who do fail as college

students, three times as many are extroverts as introverts. Being a college student simply isn't their sort of job.

"Let us take an extreme example: We had a student who had plenty of intelligence, but who had the greatest difficulty with his college work. Finally, he dropped out and by hook or crook worked his way around the world. He came back to college but again did very poor work.

"I advised him to try sales work or to get a job handling men. He answered a want ad and was soon selling washing machines from house to house in Utica. He instantly proved to be a 'whiz' and made one hundred fifty dollars the first week. He jumped to New York with this stake, and secured a job soliciting advertising, where he hit a fast pace.

"Within six months after he left school he went back to his native town of fifteen thousand people in central New York as manager of the daily newspaper which was on the verge of bankruptcy. That was only a year ago. His newspaper is now on a substantial basis; he is a director of the Chamber of Commerce, a Rotarian, and the principal fellow in his town to get things done.

"Now, what a pity it would have been to force that extrovert boy through college! Of course, not all extroverts are going to do so well, but it indicates that our introversion-extroversion tests have some value, at least, in keeping a man out of the wrong job.

"Let us discuss in some detail these twenty questions that I spoke of as good samples of our tests. You might gather the idea at first that we are unfavorable to the introverts. That is not true. The introverts do just as big work as the extroverts. One class is also just as intelligent as the other. Some introverts are brilliant and some are dumb-bells. The

same is true of extroverts. The tragedy is an introvert in an extrovert job or vice versa.

“My first question is this: (A ‘yes’ answer indicates introversion, ‘no’ indicates extroversion.)

“(1) Do you shift jobs during the day?

“The extrovert tends to plow right through the jobs of the day. The introvert is inclined to tinker with his car a few minutes, then look at the furnace, then putter around his back yard, and then get back to his car. In practical jobs they are the great procrastinators. The extrovert sticks at the car until he gets it running.

“(2) Are you inclined to forget the feelings of others?

“Not long ago I was at a scientific meeting when a certain distinguished scientist was suggested to head an important committee. All present threw up their hands in horror and said, ‘If you put that man on the committee, it will be just one continual rag-chewing.’

“Now I know that man to be an extreme introvert. The introvert is much more likely to tell you the blunt truth. He doesn’t understand the feelings of others. He should understand them, for while he is outspoken himself, yet his own feelings are more sensitive than those of the extrovert. It is a sort of incongruity. The extrovert may think something offensive, but he keeps it to himself. The introvert works well alone, but is not a good diplomat.

“(3) Do you keep yourself in the background at social affairs?

“The introvert actually *wants* to be a wallflower. Even if he can dance, he prefers to sit it out. He will not reach out for friends, and expects the other fellow to make all the advances.

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“(4) In social conversation, are you usually a mere listener?

“Your introvert likes to think, especially to day-dream, but he does not care to put his thinking into words. He may think better and wiser things than the extrovert, but just does not say them. All youngsters, for instance, are more extrovert than old people. They have not yet become reflective and self-centered.

“(5) Do you ever try not to lend things?

“Here is something very interesting about that. Although women in general are more introvert than men, they are usually more free in making loans. Moral: When you want to borrow, borrow from your sister. This shows up in the way girl friends wear one another's clothes. Men do not as a rule wear one another's clothes.

“Your hard-headed cashier at the bank is usually an introvert. The man at the pay window, who has to be affable to every customer, is usually an extrovert. Yet while introverts are ‘tighter’ about loaning money they pay more promptly than extroverts. Moral again: Borrow from an extrovert—lend to an introvert.

“(6) When praised, do you work much better?

“The introvert craves praise, and often actually fishes for compliments.

“It is mostly a waste of time to pass out compliments to extroverts.

“(7) In your daily actions, such as walking, talking, dressing, eating, are you usually deliberate and slow?

“The fellow who walks down the street, his heels thumping hard every time they hit the pavement, his coat tails flapping as he turns the corner, is probably an extrovert. It is an introvert characteristic

to be reserved in action. When the extrovert gets under pressure, he hurries; the introvert often gets rattled and blows up.

“We had thought that the extrovert, being more rapid, would meet with more accidents. But our investigations indicate no difference. It may be that the introvert, plugging along at twenty miles an hour in his car, meets with accidents because he is day-dreaming; the extrovert gets his because he is going forty miles an hour.

“(8) Do you usually work out things without asking help?

“When the introvert goes to repair his automobile, he likes to think it out himself. He would rather blunder along than ask his neighbor, who maybe could fix his car in a minute. He sometimes carries self-reliance too far.

“We found that the men in factories who make the delicate fine tools are almost to a man introverts. They are thinkers and designers. They resent interference. It is common knowledge among factory executives that tool makers are a hard bunch to handle. They call it temperament, but that is just their name for introversion.

“(9) In personal appearance, do you try to follow fashions closely?

“For instance, have you noticed that there are almost no men’s fashion magazines? There are a number of women’s magazines in this field. This is probably related to the fact that we have found women as a rule more introvert than men, and introverts follow fashions more than extroverts do. Of course problems of sex are also involved here.

“(10) Do you keep your personal property in good repair, and give it close attention?

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“When I see an automobile going down the street, all spick and span, I say to myself, ‘That man probably tends toward introversion; I would not try to borrow money from him.’ However, if he were a lawyer, he would probably be the kind I should like to have prepare a brief; or if an architect, the kind I should like to have plan and design the details of my house, but not the man to build it. In contrast, when I see a car rattling about two miles ahead of the junk heap, with the driver wearing a face like a million dollars, I say, ‘There is probably a good salesman or a good foreman—an extrovert.’

“(11) Has the opposite sex proved uninteresting to you?

“Bachelors and women who do not marry are more likely to be of the introvert type.

“The introvert has a much harder time in throwing off his love disappointments than the extrovert. Your introvert falls in love more deeply. He builds his whole home and future around one girl. If he loses her, it throws all of his thinking out of gear. The introvert woman is the same way. The extrovert says, ‘I should worry; there are plenty more fish in the sea.’

“(12) When physical courage has been needed, have you been frightened?

“The introvert makes a poor policeman or fireman. In a tight place he loses his head. There is too much action for him. The extreme extrovert is also just as bad, because of his foolhardiness. Moreover, the automobilists who hog the whole road, regardless of other people, are mostly extroverts. It is not malice, but just the recklessness of their emotional lives.

“(13) Do you dislike to speak in public?

“Nearly every organization has a few men who are always jumping up and making speeches and

offering motions and resolutions. These fellows are extroverts. They like to hear their own voices. The introvert may think more wisely and cautiously, and in the end determine the safest action, but it is hard for him to speak in public.

“(14) Do you prefer to work alone or with others?

“This is a relative of question eight. The introvert finds himself good company, while the extrovert craves companionship.

“You should understand that a good deal of both introversion and extroversion is probably acquired—due to his habits, education and circumstances. How much is due to heredity and how much to environment is pretty difficult to say. I know a famous woman who was extremely introvert. She found it was getting her nowhere and making her life unhappy. So she took herself in hand, and forced herself to become interested in other people. She is now a pretty good extrovert and personally much happier. Any person can do wonders in educating his emotions and personal attitudes.

“(15) Do you like delicate, painstaking work, rather than coarse, rough work?

“The man who polishes diamonds, or the surgeon who likes to perform delicate operations on the ear, eye, or brain tends toward the introvert type. In contrast, the man who builds his own garage in a half-day out of rough lumber shows the extrovert type. The extrovert is the promoter, the man who is interested in bold strokes. However, he is a poor man to figure out the details of a financial promotion, such as retirement, interest, amortization, maturity.

“The typical extrovert is the ideal salesman; the introvert is a splendid man to write the advertising copy—he likes to play with ideas. Some great execu-

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tives are ambiverts; they are strong both in thinking and planning and working out minute details, and yet are decisive in action. You might speak of them as intellectual, thinking extroverts—good both in thought and action.

“(16) Do you enjoy arguing?

“When two extroverts meet, they sell real estate or something else. When two introverts meet, they start an argument.

“The introvert argues for the sake of arguing. He just naturally takes the opposite side.

“Your extrovert doesn't waste much time arguing; he is always going to do big things, and very often does. He is the man who builds a house on five hundred dollars cash. The simon-pure introvert, however, doesn't begin to build until he has all the money, or more, in the bank.

“For all these reasons, your extrovert makes the best foreman. One of my former students, who is now superintendent of a brickyard, tried an experiment on this. He put an introvert in charge of one crew and an extrovert in charge of another—both crews doing the same kind of work.

“At the end of ten hours, the men under the introvert were on the verge of striking. Indeed, they agreed to come back next day only after the superintendent promised them another foreman. But the extrovert kept his men in good humor and working hard.

“(17) Are you cautious in making new friends?

“We have boys here who go through the whole four years of college and hardly know a soul. We have others who know everybody by their first names the first month they land here.

“In some old eastern towns, nearly all the extroverts have moved to the cities. The remaining inhabitants are uncommunicative. It is nearly impossible for a stranger to get acquainted in those places. I have often wondered what would happen if an introvert moved into an introvert town. He would probably remain lonesome the rest of his life.

“(18) Are you inclined to choose associates who are below you in physical size?

“Nearly every one wants to be a leader, and as a rule a leader is a big person physically, although not always. I have noticed that persons of extremely small stature try to show their leadership by choosing friends of much greater size than themselves. Also, persons of very small stature are likely to be introverts. This may be due to their being self-conscious of this one thing. They try to offset it by wearing high hats or clothes that make them look tall. We have also found that a noticeably small person tends to buy a big car. It gives him a sense of size, importance and leadership.

“As an instance of this, we had a student, a decided extrovert, who went out to a Wyoming town to sell automobiles. They called him the ‘Dude from the East,’ but he outsold every competitor. One day one of his competitors had a car almost sold to a man who was scarcely five feet tall. Our ‘Dude from the East’ got the biggest car he had, and parked it by the side of the small car of his competitor. He then asked the short man to stand in front of the two. He instantly chose the big car.

“Now, this is all exactly in line with our work. This big car gave that man *self-realization*. And in one

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way or another we are all just like him. If we are not short on stature, we are short on something else, and we want the feeling of dignity, power and greatness. The introvert takes his way of getting these things, and the extrovert takes his way. But if you carry either side to the extreme, you will find it a severe handicap to your self-realization. Nearly all of us lean either toward the introversion end or the extroversion end of the scale, though few, perhaps, balance dangerously one way or the other. Whether these tendencies are inborn or acquired makes no essential difference. The point is they represent, for the time being at least, inner necessities and emotional needs which seek an outlet in work that gives to each individual full and complete satisfaction.

“We are now endeavoring to find out whether introverts choose introverts for their friends and extroverts choose extroverts; also, whether an introvert married to an introvert, or an extrovert married to an extrovert tend to make the happier married couple. So far, our investigation indicates that like tends to choose its like in these respects, and that this brings the happiest results in friendships and in married life.

“(19) Do you rewrite many of your letters before mailing them?

“We have found this a very good test of introversion-extroversion. For instance, not long ago I had a letter from a prominent New York editor who is a decided introvert in his thinking, although in his actions he tends somewhat toward extroversion. His letter was so full of interlineations, additions and corrections that it was evident his mind was still working on

the letter after his secretary had finished it. Indeed, the letter was mostly rewritten. Introverts are always adding postscripts and afterthoughts to their letters.

“(20) Do you talk to yourself from time to time?

“The absent-minded professor who walks about the campus, talking to himself and gesturing, is an example of the decided introvert. The introvert tends to live in an imaginary world. If it is carried to extreme, it develops into the form of insanity known as ‘*dementia præcox*.’ Extreme extroversion, however, is just as bad. It leads to the mental disorder known as ‘*manic-depressive insanity*.’ That is the kind of insanity where the afflicted person is hilarious and excited one day or one hour and depressed and melancholy the next.

“The introvert carries old grudges. He is still gritting his teeth and swearing under his breath at the traffic cop that bawled him out last week. The extrovert has forgotten the bawling out, and may have been arrested two or three times for traffic violations in the meantime.

“These twenty questions may seem very trivial. Each one taken by itself may not have great reliability; but when you score the whole twenty honestly with yourself, and especially if you extend them on to the entire forty-eight questions, which Mrs. Laird and my students and I have spent five years in selecting and testing out on all sorts of people, you will find that they give a pretty reliable index of these large traits of your emotional make-up. They have no relationship that we can find to intelligence, that is, the introvert is just as likely to be a dumb-bell or a genius as the extrovert. But it does make a ‘whale of a dif-

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ference' in your success or failure at your job, and the self-realization you get out of it.

"As a prime example of the usefulness of these tests, at least in keeping you from taking up the wrong job or profession, last year a big company put a new adding-machine on the market and sent out a number of salesmen, some of them experienced and some of them new men. They all had about the same average intelligence, and the territory was fairly allotted. We tested all the men with our introversion-extroversion battery. Some made a big success and some made a big failure; but among the failures there were three times as many introverts as there were extroverts.

"As I said in the beginning, we tested the students who have flunked out here in their college work, and we found that three extroverts flunk out to one introvert. It is not lack of ability—it is lack of emotional interest and satisfaction in doing college work.

"Another evidence that these questions have real validity is that we find there is considerable relationship between the way you answer them and the *size and volume of your body when compared with the length of your legs and arms*. This comparison does not have much value after one is twenty-five, because so many people begin to put on fat after that age. If they do not, however, the comparison still has considerable reliability. Before that age the relationship we have found is very significant.

"What we measure is the sheer *trunk volume*—that is, the *cubic contents* of the body trunk—and then compare that with the length of the limbs. You can easily be deceived about this, as you are likely to think a person with short, full, bulky body has a great trunk volume. Sometimes this is true and sometimes not. But, even if so, it has no significance for our purpose

except as you *compare it with the length of the arms and legs*.

“For instance, I have said that extroverts make the best salesmen. Yet, if you go to a convention of salesmen, you will see plenty of thin skinny fellows that at first glance you would say were introverts. When, however, you come to measure the actual volume of their body trunk and compare it with the length of their legs and arms, you will usually find that they really have large body volume as compared with the length of their limbs.

“You will also find big, bulky-looking fellows who fail as salesmen because they are introverts. But you will discover, as a rule, that their big body bulk is due to fat, or else, when you size up their trunk volume, you will find it is small as compared with the length of their arms and legs. They really have what we call an introvert bodily make-up.

“We are finding that there is here a real anatomical basis for the general trend of one’s temperamental characteristics. We have thirty measurements which we make with special instruments imported from Czecho-Slovakia by the Smithsonian Institution. They are the most accurate anthropometric instruments in the world.

“Speaking generally, the person who has moderate or small trunk volume *in comparison* to rather long legs and arms, tends to be an introvert; and those with large trunk volume *compared* to short legs and arms, are much more likely to be extrovert. President Coolidge is distinctly an introvert. He would certainly answer the question, ‘In conversation are you a listener?’ with a ‘Yes.’ He would probably say that in shorthand. Contrast him with such men as Roosevelt, Lloyd-George and Bryan.

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“Just look about among your friends, and think of the endless talkers and chronic visitors, and also study those who have the other introvert or extrovert characteristics which these questions, *when given as a whole*, bring out, and I am sure you will see that there is a tendency for them to fall into these two types of appearance and bodily make-up.

“We do not pretend to be able, by these tests, always to tell a man just what job he should go into, but we can usually tell him what job he should not go into. And this is just about as good, because if we can steer an introvert away from an extrovert job, he is bound to land in an introvert job. And the same is true of the extrovert. Why should a man go through the mental suffering, hardship and discouragement of trying to make himself over? It can be done to a considerable extent, but why place yourself where you have to do it in order to like your job? The marked introvert should cultivate extrovert qualities, and the extrovert should take lessons from the introvert; but there is no use of the one trying to transform himself into the other, or do the other's work.

“Intelligence is only a small part of our lives. The satisfaction of our emotions, our hopes, passions, inspirations and desires is the greatest thing in the world. As Robert Louis Stevenson said, ‘To miss the joy is to miss all.’ And our hope is that our Colgate Mental Hygiene Tests have made a little step toward the time which Kipling prophesied, “When every one shall work for the joy of working.” That time can come only when psychology and industry shall be able to fit each man to his job and the job to the man. That is what I mean by the term of self-realization. It means doing your best work and making the most of your self at the same time.”

Directions for Scoring

To make up your own score and find whether you are an introvert, extrovert or ambivert, you must first answer each of the forty-eight questions in the Personal Inventory. Notice that there are five printed answers to each question, and that each of the five questions has *two* numbers above it—the entire series of numbers running from one to ten. After reading over the phrases in *small* type following each question, think back over your life for the past few months and place your X under the number which *best* describes your average behavior and thoughts. For instance, if you are very strong on any answer you mark the *first* of the two numbers above that particular answer; if you are rather weak or moderate mark the second number.

When you have marked all the answers, turn to the score table on page 84, carefully reading the explanation of the score marks. Then total up the number of crosses on your inventory which fall under the score marks given in the appropriate table.

At first glance, you might think, since there are forty-eight questions and three emotional or personality zones, that sixteen answers one way or another might decide the matter. But this is not the case. Between the introversion and the extroversion zones which, of themselves, are not of equal range (this being because there is a stronger leaning toward introversion than extroversion in the human race) lies the wide ambiversion zone, in which the two types of mind are pretty evenly mixed. The reader is asked, therefore, to take some figures for granted, as it has been found by long experience, which we can not go into here, that if a certain number of questions are answered introversionally then a proportionate number of questions are automatically answered extroversion-

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ally. That is the way the mind works. For instance, if a man answers fifteen or more questions introversionally he has answered not more than nine extroversionally, therefore he is an introvert.

If a man answers five or fewer questions introversionally, he has automatically answered not fewer than nineteen extroversionally, therefore he is an extrovert.

If a man answers not fewer than six or more than nine questions introversionally then he automatically answers fifteen to eighteen extroversionally, and that puts him in the ambivert class.

The reader should understand that these tests probably do not altogether measure inborn organic trends that the individual can not change. The first tests of this nature were devised, I believe, by Prof. Robert O. Woodworth, of Columbia University, in order to measure what he termed the "Neurotic Index" of the soldiers during the war. The idea was to measure the neurotic, or abnormal nervous tendencies of the soldiers, to find out how strong or weak these tendencies were. By persistent effort one may change these tendencies a great deal. Doctor Laird recently told me that he had known decided introverts to cultivate an interest in other people, in outside things, games, sports and social life, and that in time they became much happier and much more extrovert than they had been. These tests are an excellent measure no doubt, of your present mental and emotional habits, but you can change these a great deal if you so desire.

PERSONAL INVENTORY—HOW TO TAKE STOCK OF YOURSELF

	1	2	3	4	5	6	7	8	9	10
1. How steadily have you worked at the ordinary task of the day?	continuously until completed	steadily only	at en-joyed ones	shifted only with mood	shifted from one to another	spurts of work				
2. How have possible misfortunes entered into your thinking?	worried about them for some time	worried but soon forgot	usually thought what might happen	few apprehensions	imperturbable					
3. How easily have your feelings been hurt by remarks or actions referring to you?	easily and often aroused	feelings easily hurt	usually noticed others' intentions	affected in rare in-stances	save them no at-tention					
4. How have you considered the feelings of others?	told truth regardless of feelings	sometimes forgetful of feelings	considerate only of some people's	frank, yet tactful	generally careful not to hurt them					
5. How have you acted and felt at social affairs?	usually kept in back-ground	retiring at a few affairs	let others entertain, talk, etc.	liked to do enter-taining	usually lead					
6. How well have you remembered most of the errands and details of your daily routine?	continuously forgetting	occasionally forgetful	forget minor ones	usually remember all	rarely forget					
7. In social conversation how have you been?	talkative	an easy talker	talked when necessary	preferred listening	refrained from talking					
8. How have you decided upon matters of daily conduct?	deliberated almost everything	searched for good reason in most in-stances	deliberated only im-portant things	followed first impulse in many instances	usually followed first impulse					
9. How have you generally been about making loans?	gave to any one who asked	loaned only to some people	rarely loaned							
10. How have you generally taken to discipline and commands?	always followed as a matter of course	followed, but thought it over	considered reasons for following	rebelled inwardly but obeyed	ignored when possible					
11. What about a diary?	fairly complete record kept	occasionally recorded events	desired to keep one, but did not	do not keep any						
12. How have you responded when praised?	did not work so well	worked same as usual	sometimes did a little better	often worked better	generally worked much better					

Read each line through and answer only after thinking over the questions. The past few months only!

13. How have you felt when praised, etc.?

thought it over seriously	pondered some praise	took praise lightly	quickly forgot	seldom noticed it
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14. How have you moved when walking, talking, dressing, etc.?

generally deliberate	seldom in a hurry	occasionally hurried	usually rapid	impulsive; very quick
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15. Have you studied the motives of others?

seldom considered	have observed motives a few times	occasionally try to unmask motives	sometimes studied motives	inclined to study motives carefully
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16. How are your beliefs in politics, religion, social change, etc.?

urge liberal changes	think many changes needed	think changes needed in some lines	give them little thought	hold traditional views
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17. Have you been inclined to work on things alone?

usually did not ask for help	hesitated to ask for aid	sometimes sought help	did not hesitate to seek aid	sought and got help in quite a few cases
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18. What attention do you give dress and personal appearance?

dress rather for comfort	give some attention to appearance	selected mostly for appearance	try to follow fashion	close attention to dress
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19. What care have you taken of your property (books, watches, clothes, etc.)?

kept close watch of all	take reasonable care	care only for some	only necessary care	tendency to be neglectful
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20. How have your likes for athletics and things intellectual compared?

liked best all in- tellectual	preferred intellectual	little preference	preferred athletics	happiest in all physical contests
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21. How have you felt when you lost a contest or date or made a poor recitation?

no thought given it	quickly forgot	sometimes gave serious thought	thought about it for some time	greatly upset, brooded over it
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22. Have you unburdened your troubles and worries?

very freely	inclined to be confidential	tell some troubles	rarely unburden them	keep all to myself
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23. What use have you made of day-dreams?

always day-dreaming	many day-dreams; some practical	generally practical		plan, but do not day-dream
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PERSONAL INVENTORY—HOW TO TAKE STOCK OF YOURSELF

	1	2	3	4	5	6	7	8	9	10
24. Have you made friends with the opposite sex?	generally avoided them	felt less comfortable with them	did not care one way or another	use head to advantage	kept composed with effort	seldom noticed them	ignored them	enjoyed their company	sought their company	
25. How have you acted in dangerous or embarrassing situations?	always cool	usually level-headed	sometimes self-conscious	regarded work rather than self	use head to advantage	kept composed with effort	ignored them	enjoyed their company	sought their company	
26. How have you felt in front of strangers or a large crowd?	as if watched	usually level-headed	sometimes self-conscious	regarded work rather than self	use head to advantage	kept composed with effort	ignored them	enjoyed their company	sought their company	
27. How have you acted in times when physical courage was needed?	reckless; no fears	generally fearless	avoid only unnecessary ones	always cautious	scared, craved it					
28. Have you experienced fine sentiments and emotions?	easily moved to tears	sympathized readily	not especially sensitive	often unmoved	unsympathetic					
29. Have you found it easy to speak in public?	enjoy it very much	can with ease	sometimes easy	hard to express self in public	avoided it					
30. How have you acted in times when mental courage was needed?	cool and deliberate	calmed self by reasoning	considered consequences	inspired it was all over	gave up					
31. How have you been at selling things?	delighted in convincing customer	have sold many	sold only by great effort	can take orders but not sell	avoided selling					
32. Have you worked with others?	much preferred to work alone	inclined to be independent	worked with others in some cases	liked working with others	sought work with others					
33. What kind of work have you liked best?	coarse rough work	rather liked manual labor	not particular	liked exact delicate	preferred very painstaking					
34. Have you liked to convince others, argue, etc.?	looked for such chances	enjoyed convincing people	not very argumentative	dropped arguments quickly	avoided them					
35. How do you compare with your chosen associates intellectually?	superior	a trifle better	about equal	slightly below majority	inferior					

Take time to read each line carefully and answer thoughtfully. Consider only the past few months

36. How have you been about making friends?	cautious	must know them a long time first	slightly reserved	get acquainted easily	make friends with every one
37. How do you compare with your associates physically?	superior	above average	about equal	a little below average	inferior
38. Have your moods changed without apparent cause?	often changed	changed in some instances	kept in fairly uniform spirits		moods almost always the same
39. Have your moods changed with cause?	always responded quickly	fairly quick response	must be strong reason		seldom changed
40. How high a value have you placed on yourself and on your abilities?	high estimation	above average	about medium	below average	very modest estimation
41. How about blushing?	readily; very often	rather often	once in a while	very rarely	never notice it
42. Have you expressed yourself better in speech or in writing?	best in writing	preferred writing	no preference	preferred speaking	talk considerably better
43. Have you given much attention to form and style in literature?	very critical and appreciative	noticed mistakes	read because of interest		read to pass time
44. Have you rewritten your letters before mailing?	many letters rewritten	rewrote some	occasionally rewrote one	made some corrections	always let first draft go
45. Have you talked to yourself?	not at all	occasionally notice it		quite often	very frequent occurrence
46. How have you met the obligations of your conscience?	very promptly at any cost	careful to obey conscience	somewhat lax and tardy	often overlook obligations	they do not bother
47. What have you done when things went wrong?	felt sorrow and pity for self	sorrowful but not utterly discouraged	tried to rectify them	indifferent to many	gave them little thought
48. How have you been in sharing your things with others?	consider myself selfish	have shared but reluctantly	have shared in many cases		have at sacrifice of own interest

No. of questions	Score marks	No. of questions	Score marks	No. of questions	Score marks
1	5 to 10	17	1 to 2	33	7 to 10
2	1 to 3	18	6 to 10	34	1 to 5
3	1 to 4	19	1 to 2	35	1 to 4
4	1 to 4	20	1 to 4	36	1 to 5
5	1 to 4	21	7 to 10	37	1 to 4
6	1 to 4	22	8 to 10	38	1 to 3
7	6 to 10	23	1 to 5	39	1 to 3
8	1 to 3	24	1 to 6	40	1 to 3
9	7 to 10	25	7 to 10	41	1 to 4
10	7 to 10	26	1 to 3	42	1 to 2
11	1 to 6	27	7 to 10	43	1 to 4
12	9 to 10	28	1 to 3	44	1 to 6
13	1 to 3	29	8 to 10	45	4 to 10
14	1 to 4	30	5 to 10	46	1 to 4
15	7 to 10	31	9 to 10	47	1 to 5
16	1 to 3	32	1 to 4	48	1 to 6

NOTE: The score marks given in this table indicate only *introversion*. Therefore, if any of your crosses to the questions on the Personal Inventory are under numbers not given on *this* table, then you are extrovert or ambivert on that particular question, for example, if your mark X on question 5 of Personal Inventory falls on 1—4 you are an introvert on that one question; if on 5—10 it signifies extroversion or ambiversion (according to the placement of the mark). If your X mark on question 33 of Inventory falls on 7—10 it signifies introversion; if on 1—6 extroversion or ambiversion is indicated.

As the totals of men and women have a different significance, women requiring a higher total to indicate introversion, extroversion and ambiversion (owing to the fact that women are more likely to be introverts than men) two separate scores for men and for women, are printed below.

Scores for Men

(1) If you are a man and have fifteen or more crosses which fall under the numbers printed in the scoring table, you are introvert. You would probably find the greatest self-realization in one of the follow-

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ing occupations: proof-reader, research investigator, accountant, inspector, die-maker, jeweler, artist and all similar occupations which require fine, keen, careful attention and accuracy.

(2) If you have five or fewer crosses falling under the numbers in the scoring table, you are not introvert, but extrovert, and would likely be happiest and most successful in the following occupations: salesmanship, foreman, organizer, nurse, hotel clerk, politician, demonstrator, contract man, explorer, and similar occupations requiring plenty of contact with people and the outside world generally.

(3) If you have anywhere from six to fourteen crosses (inclusive) falling under the scoring table, you are ambivert and would probably find excellent self-realization in the following: office clerk, general mechanic, store proprietor, minister, teacher, chauffeur, detective, manager, and those occupations which require a good many of the qualities of both the introvert and extrovert.

Scores for Women

The difference between the scores for women and for men is that a woman is introvert if she has twenty or more crosses under introversion, where men require only fifteen. She is extrovert if she has ten or less under the scoring table numbers where men require only five or less in order to be extrovert. This shows how much more likely men are to be extrovert than women. A woman is ambivert if the total number of her crosses which falls inside the scoring table range from eleven to nineteen inclusive.

A woman introvert, extrovert or ambivert, finds self-realization in occupations calling for the same sort of mental traits as fit the occupations assigned to the men of the same type.

CHAPTER V

HOW WE JUDGE OURSELVES AND OUR FELLOW MEN

BUSINESS and educational psychology has been greatly enriched by the researches of Prof. Henry Foster Adams of the Department of Psychology of the University of Michigan. He was born at Oak Park, Illinois, in 1882, and received the Degree of Bachelor of Philosophy at Wesleyan in 1905 and the Degree of Doctor of Philosophy at the University of Chicago in 1910. In the latter year he was called to the University of Kansas as assistant professor of psychology, and, in 1911 and 1912, was assistant professor of psychology at the University of Chicago. From the University of Chicago he went to the University of Michigan where at the present moment he is carrying on a number of interesting researches, among which is one bearing upon the accuracy of various scales for isolating and measuring mental functions and abilities.

Professor Adams is the author of some delightful essays, entitled *Gold Brick Psychology*, and has also published many researches. In the following interview, he discloses some entirely new psychological discoveries which, if carefully studied, are bound to be of great value both to business men confronted with problems of selecting employees, and to young men and women confronted with the problem of appraising their own abilities with a view to selecting the best career.

V

How to judge yourself and how to judge your fellow human beings correctly are without doubt two of the most important things in your whole life.

Your success or failure, your ability to get along with others, your capacity to adjust your home life and your work in the office or factory, your popularity or unpopularity, and many other things that affect your life and happiness are wrapped up to a large extent in the answers you make to these two questions: Am I judging myself correctly? and, Am I passing fair and just judgments on other people?

Since these questions are so important, it is surely worth your devoting a little time and industry to answering them. You may doubt that these questions can be answered. You may doubt that your traits of character and personality and those of your fellow men can be measured. I doubted that very greatly myself until, in December, 1926, I was attending a meeting of the American Psychological Association at Philadelphia, and heard Prof. Henry Foster Adams, psychologist of the State University at Ann Arbor, Michigan, describe the methods that he had invented and applied successfully for a number of years for measuring the traits of human personality and character.

My confidence in the methods that Professor Adams described at this meeting was greatly strengthened by the fact that they met with a most favorable reaction from the psychologists who heard him. I happened to be sitting by one of the leading psychologists of the world and, as the reading of the paper

proceeded, he kept exclaiming to me with enthusiasm, "My, that's fine. That is new; that is very important!" I might add that I have myself for several years read ten or twelve technical journals of psychology every month. These journals describe all the leading work in psychology that is going on in this country and Europe; and I have not seen or heard of any method of judging personality and character which has appealed so strongly to me both for completeness and accuracy as this one devised by Professor Adams. It is therefore with a great deal of confidence in its merit that I have induced Professor Adams to describe it for my readers.*

I might say in advance that it will require a little time and industry on your part to work it out. This is because it is not possible to measure fifty or sixty traits of character in yourself and the same number in a team of five or ten of your friends in some magic way in four or five minutes. However all the work of figuring up the final results and making out your character and personality ratings has to be done by some one whom you select as your team leader or team captain. It is surely, therefore, worth this small amount of effort to learn just how persistent, how prudent, how tactful you are and how much will power you have and capacity to work for a future goal, as well as to discover more than fifty of your other traits

*No doubt some psychologists will maintain that character ratings or judgments are not accurate measurements of true mental functions of the individual. I do not know what may be the opinion of Professor Adams on this point. One can conceive that for practical social purposes what we think of a man probably measures pretty well what he is even though our judgments do not correspond to actual mental functions within him. The point is too technical to discuss here. Suffice it to say that Professor Adams has done further work of great importance, not yet published, that tends to strengthen the impression that a high degree of accuracy can be obtained by this method in securing a true measure of the traits of an individual.

of personality and character. It is also worth your while to learn just how you stand in the estimation of your fellows and also to learn how accurately you can judge them. For it is only when you know what your strong and weak points really are that you can work effectively to pull up your weak ones and put in your besticks to refine and improve your strong ones.

When I visited Professor Adams recently at Ann Arbor in order to learn all the details of his methods, quite naturally the first question I asked him was, "Do you believe that the broad general traits of human personality and character can be measured?"

"To use common parlance, I am 'sold' on that idea," he replied with emphasis. "Of course we can not take a yardstick and tell with it just how persevering you are or how much you will blow up in an emergency, or how truthful or domineering or prudent or gossipy you are. We can not tell how angry a man is by the redness of his face or how optimistic or broad-minded he is by the size of his nose or shape of his head. We can not weigh prudence or generosity by the pound. We have no absolute measurement such as a thermometer that begins at zero and runs up and down. We can not say this man is seventy degrees persevering, that one is sixty-five degrees aggressive, another is ninety degrees in will power and the like. Moreover, we are confronted with the further difficulty that no two human beings are ever twice exactly alike. You may be impatient to-day and patient to-morrow; you may be patient with me and impatient with Smith or Jones; you may persevere at one task and not persevere at another. Yet with all these difficulties we believe we have devised methods of measuring personality and character here at Ann Arbor that are ninety-five per cent. correct. And that is a pretty close estimate for all ordinary purposes."

In order to get the general method before you as quickly as possible, I shall run over the main points first in my own words as to just what Professor Adams has done. Then in the next chapter he will tell you himself some of the remarkable conclusions which he has been able to draw from his work. Professor Adams has found for one thing that there is a vast amount of difference as a rule between the sort of persons who can judge themselves correctly and those who can correctly judge other people. An incident happened as I was returning from my visit with Professor Adams at Ann Arbor to my home in New York that forcibly brought home to me this difference in people. I stopped overnight in Toledo, and, as I was sitting in the lobby of a large hotel there, a man whom I took to be a traveling salesman—you see we are always judging other people whether we are right or wrong—came striding down the corridor at a two-forty pace. As he came through the entrance into the lobby, his toe caught under a heavy Oriental rug, about eight by ten feet in size, and he kicked it all into a heap. I naturally supposed he would stop and make at least a little show of adjusting it or else call a bell-boy to look after it; but to my surprise he did not even hesitate. He glanced over his shoulder carelessly at the damage he had done, strode across the room, sat down in a chair with a group of other men and instantly plunged into an animated conversation in which he was evidently telling them what they ought to do.

Now by the time you finish this chapter, I believe you would wager a good deal of money, as I would after spending a day with Professor Adams, that that man was probably a poor judge of himself and a good judge of other people. I might miss it badly,

because this is only one test out of many, but I would wager a considerable sum that he was probably not particularly intelligent, that he lacked the courage of his convictions, that he was not especially conscientious, that he was probably a physical coward, that at times he had the blues, that he was an introvert, and that he was likely to blow up in an emergency. Of course, I may have been entirely wrong, but let us see if by the time you finish this chapter you will not also be ready to agree that my snap judgment of that man was at least trending in the right direction.

What Professor Adams did was to secure teams of college students, each team consisting of ten members. These students rated both themselves and the other nine members on each of sixty-three mental and personality traits and fifteen physical traits, such as height, weight, hair color, size of mouth, color of eyes, etc. The list of the personality traits is given on pages 122 and 123. It is not necessary for you to rate your friends on physical traits as Professor Adams merely used these as a check.

The unexpected discovery came out, however, that *we judge our friends more accurately on their subjective mental and personality characteristics that we can not see, than we do on the physical characteristics that we can see.* This is certainly contrary to our notions. Professor Adams says that it is because we have never said to ourselves: "George has a mouth of such and such a size, his eyes and hair are of such and such a color, his nose is just so big and he weighs just so many pounds." But we have said to ourselves many times: "My, George is awfully touchy, or frightfully persevering, or immensely egotistical, or a great big coward, or a regular hero, and the like."

As a consequence we have a more accurate, mental and verbal picture of the personality traits of our friends than we do of their bodily characteristics. This fact showed also that the method Professor Adams has devised for measuring personality is a very accurate one since it measured personality traits better than we usually measure physical traits.

The teams consisted of students who had known one another for from one and a half to two years or more and who had no reason for being especially fond of one another or for being especial enemies. They were mostly from the same group or fraternity or sorority. This fulfills the most approved conditions for judging character, namely that people shall know one another well, but not too well. That is, a husband and wife can not usually judge each other in a cool-headed way; the same is true of parents judging their children and vice versa, and also of lovers trying to judge each other. In fact sweethearts can not come within a mile, so to speak, of giving each other a valid personality and character rating. At first thought it might occur that members of the same fraternity would be too close to one another. But it should be remembered that they are selected by upper classmen and not by one another as members. As a consequence, in a group of ten, no more are likely to have a mutual "crush" than a mutual dislike. In fact, fraternity brothers or sisters furnish almost ideal material.

Professor Adams used, all told, eight different teams. On some of the judgments he used nine teams. A team would be called together and instructed how to proceed. Should you form a team in your office or among your fellow workers in the factory or among your schoolmates, as I hope you will, you would pro-

ceed in the same way as follows: First get your team organized and agree on a team captain or leader. Your school-teacher or foreman or department head or one of your fellow office-workers can act as team leader. Any one who can do simple arithmetic up to one hundred can act as leader. You should then meet and with your leader present go over all the traits to see that you all understand them in the same way.

The method of rating is simplicity itself. Write the list of traits at the left side of a large sheet of paper and rule the paper with a pencil into ten columns and put your own initials at the top of the first column and the other nine, one at the top of each column. Then put down the one whom you think is the strongest on any trait as Number 1. The next strongest is 2 and on down to 10 who, in your judgment, is the lowest member of the team on the trait. Then go through the sixty-two remaining traits in the same way.

It is a good plan to take the sheets home and sit down alone and quietly think over each friend on each trait. It is also best to rate only about fifteen or twenty traits at a time so as to keep your interest keen and fresh on each trait. This also gives you plenty of time to think each friend over quite thoroughly.

Professor Adams had his students rate only twenty-one traits at a time and had them do the rating only once a week. At the beginning of the fourth week he also had his students rate one another all over again in order to see how accurately their judgments checked after they had forgotten just how they had rated Jane and John and Mary and the rest of the team. This made the two ratings on any trait just one month apart.

The astonishing thing was that many of the judg-

ments made a month apart agreed perfectly. The average agreement of the fifty-two or fifty-three thousand judgments of all the eight teams made a month apart was so close that it would be expressed by the figure eighty-five one-hundredths. If the two series of ratings had agreed perfectly of course you would express it by the figure 1, that is, complete unity. Had they not agreed at all, you would express this fact by zero. Consequently when they agreed eighty-five one-hundredths of perfection, this was truly gratifying and indicates again the accuracy of the measurements.

This agreement between the first and second ratings indicates the accuracy of the ratings because it shows that we have traits that stand out clearly enough so that people in general give them the same label at one time that they do at other times. Of course these traits vary somewhat in us from month to month and from year to year, yet they seem to remain fairly consistent and are the things and the handles, so to speak, by which our friends come in time to know us. As Professor Adams expressed it, each trait is somewhat like a cow tied to a fifty-foot rope. She can graze all over the lot to the fifty-foot limit and still be a normal cow. One day she is at the north end and the next day at the south end of the lot, but nevertheless she is still the same old cow.

So with our traits of courage, or tactfulness, persistence, talkativeness, self-consciousness, optimism and the like. They are stronger at one time than at another, but as we go through life they stand out within their up and down limits so that our friends can judge them with a pretty high degree of accuracy. They never break the rope or wander entirely off the lot. This was proved by the remarkable way in which

the students would recognize one another's mental traits without even having the names attached. They would frequently look over the records and say, "Well, that one that stands so high in resoluteness, neatness, industry and perseverance must be Mary," "That egotistical one is William all right," and so on. And since the judgments all tended in the *same general direction*, it showed that our friends know us pretty well. They all agreed to a pretty high degree on one another's traits, although the agreement, of course, was not perfect. If it had been it would have shown they had made it up beforehand. But the agreement was so close that it showed that it is hard for a man to conceal his real self in this small world.

Now when you have finished rating all the team on your sheet, you should hand in your rate sheets to your team leader, and he will have to figure up the results. This is by far the most interesting part as it gives you your final scores. Of course Professor Adams figured all the results for his teams. Let us examine the sample set of ratings which Professor Adams gave me from his files. It shows the *actual ratings* that the members of one of his teams made of one another on the single trait of "popularity." It is certainly worth a good deal to find just exactly how popular you are. If you find you rank low, better have a heart-to-heart talk with yourself. If you are rated high by the team then look at your own rating of yourself and see whether you over- or under-estimated your popularity. If you over-estimate yourself it indicates a lot of other things in your character, and if you under-estimate yourself it indicates a different set of other traits in your personal make-up as we shall soon see.

HOW WE JUDGE OURSELVES AND OTHERS ON POPULARITY

TABLE I

	John	Donald	Ted	Lucile	Philip	Dorothy	Sam	Jack	Virginia	Kathleen
John	(9)	1	8	3	4	5	6	2	7	10
Donald	2	(3)	4	9	6	5	8	10	7	1
Ted	1	4	(7)	9	2	3	10	6	5	8
Lucile	1	3	7	(4)	2	10	6	5	8	9
Philip	4	1	8	6	(7)	2	10	3	9	5
Dorothy	2	1	8	4	5	(3)	9	7	10	6
Sam	2	1	10	3	6	9	(5)	4	8	7
Jack	2	1	6	8	3	4	10	(9)	5	7
Virginia	2	1	3	4	8	5	6	9	(7)	10
Kathleen	3	1	8	9	2	5	10	7	6	(4)
	2.8	1.7	6.9	5.9	4.5	5.1	8.0	6.2	7.2	6.7
Final Team Rating	2	1	8	5	3	4	10	6	9	7
	John	Donald	Ted	Lucile	Philip	Dorothy	Sam	Jack	Virginia	Kathleen

I have, of course, given these persons fictitious names. All of the figures in parenthesis are the ratings that each person has given to himself on his rating sheet on the point of popularity. It is easy to see what the table means. You see at the upper left-hand corner John first rates himself 9 and puts this figure down at the right under his own name. Plainly John does not think he is very popular. Next to the right he rates Donald's popularity and has set him down 1. He regards Donald as the most popular one of the team. He puts Ted 8, Lucile 3 and so on down to Kathleen whom he rates 10.

Quite possibly John does not like Kathleen, because on the next line below you see Donald has rated her 1. Donald seems to have a liking for Kathleen. Donald

rates himself 3 on popularity and he rates John 2. He puts Jack down as the least popular, that is 10, whereas John, you see, rated Jack 2. You can very easily go on yourself through the tables at your leisure and see exactly what each one thought both as to his own popularity and as to the relative popularity of the nine others.

Finally when your team leader has set down all these ratings taken from the separate rating sheets it is easy for him to add up each column and compute the total score on popularity of each member of the team. You will see each one's score below the table. It is better to divide the total score of each member by ten, as it makes it easier for subsequent comparisons. For example, you see Donald's total score is the lowest, 17, or if divided by 10, 1.7. He is therefore the highest and the most popular member of the team. His final score is therefore Number 1. John comes next, Number 2. Philip is Number 3, Dorothy 4, and so to the end of the scale. Sam gets the "booby prize" in this instance and is rated 10. It is probably the best thing Sam ever had happen to him to learn this because if you look back at his own self-rating you will see he rated himself 5 in popularity. It was probably quite a healthy and much-needed warning for Sam to learn that he had over-estimated his popularity 100 per cent.

And this brings us to the last and most important step in Professor Adams' whole scheme. This step is to have your leader ascertain *how far wrong you are in your judgment both of yourself and of others*. That is the biggest thing of all, because this answers both questions I asked at the beginning: First, Are you a good judge of yourself? And, second, Are you a good judge of others? Then later Professor Adams will tell you what it indicates to be either a good or

a poor judge of self or to be a good or poor judge of others. Your team leader can easily make out the second table to show how far wrong you are by simply copying the first table in a little different way. The following table shows how this is done.

HOW FAR WRONG WE ARE IN JUDGING OURSELVES AND OTHERS

TABLE II

	John	Donald	Ted	Lucile	Philip	Dorothy	Sam	Jack	Virginia	Kathleen	Error of estimating		
											Self	Others	
John	-7	0	0	+2	-1	-1	+4	+4	+2	-3	-7	1.9	John
Donald	0	-2	+4	-4	-3	-1	+2	-4	+2	+6	-2	2.9	Donald
Ted	+1	-3	1	-4	+1	+1	0	0	+4	-1	+1	1.7	Ted
Lucile	+1	-2	+1	+1	+1	-6	+4	+1	+1	-2	+1	2.0	Lucile
Philip	-2	0	0	-1	-4	+2	0	+3	0	+2	-4	1.1	Philip
Dorothy	0	0	0	+1	-2	+1	+1	-1	-1	+1	+1	0.8	Dorothy
Sam	0	0	-2	2	-3	-5	+5	+2	+1	0	+5	1.7	Sam
Jack	0	0	+2	-3	0	0	0	-3	+4	0	-3	1.0	Jack
Virginia	0	0	+5	+1	-5	-1	+4	-3	+2	-3	+2	2.4	Virginia
Kathleen	-1	0	0	-4	+1	-1	0	-1	+3	+3	+3	1.2	Kathleen

In the second table the team leader has simply taken each single estimate from the first table and subtracted it from the final standing of each member at the bottom.

For example, looking back at Table I again you remember that John rated himself 9 on popularity. But you see at the bottom the team rated him 2. Consequently John has underestimated himself 7 points. So the team leader marks his self-estimate

minus 7 points wrong and sets 7 under John's name and on his line. Next to the right John rated Donald 1. The team also rated him 1. So here John's judgment is in perfect agreement with that of the entire team. So the team leader rates John's judgment of Donald 0, meaning perfect. John rated Ted 8 and the team rated him 8. Again perfect. Next you see John rated Lucile 3. The team rated her 5. So John over-estimated her 2 points. So the team leader sets this error of John as plus 2 points wrong.

Going on to Kathleen at the right upper corner you see that John on Table I rated her 10, the lowest, and Donald rated her 1, the highest. Possibly she is Donald's sweetheart! John plainly under-estimated her 3 points, so we set Kathleen down 3 on John's line. But poor Donald probably got quite an unpleasant surprise—see the next line below—when he found that the team had rated Kathleen 7. Since he rated her 1, he has over-estimated her 6 points—more than six hundred per cent.! So the team leader marks Donald's error plus 6 on Kathleen.

You begin to see now the great advantage of using closed groups of several persons so that the errors in judging check-mate against one another. Of course you could use a team of five persons, but ten gives far more accurate results because the likes and dislikes cancel each other more completely. You could also use ten or twenty or any other number of traits instead of sixty-three; but the more judges and the more traits the more accurate will be the general personality rating. In a group of five the likes and dislikes are fairly well canceled, but in a group of ten they are far more than twice as likely to be canceled, since the total number of judgments are so greatly increased in proportion.

Just one step more and then your leader can chart

out your complete character profile from the findings. This step is to find out *how far wrong you are on the average*, that is, the size of your total average error in judging others. You can see at a glance your own error in judging yourself, but in order to find your *average error in judging others* it is necessary to add the errors in the ratings on your line in the second table together—excluding your self-rating—and then divide the total by 9. It is best also to set beside it the error each one has made in judging himself or herself. These two columns are at the right end of Table II. So you can see when this computation is made whether you are a good self-rater and a good other-rater or good at one and poor at the other.

Let us take John again for example at the extreme right. He was wrong by 7 points in estimating himself. So we set this down at the right minus 7. But after adding all his errors together and dividing by 9 you find his *average error in judging others* is only 1.9 points. So you see John is a far better judge of others than he is of himself. Next, Donald under-estimated himself 2 points and his total average error on others is 2.9. As you run down the other scores, at the right in order, you see Donald's average error of 2.9 points is the largest one of all. This means that he is the worst judge of character (on this particular trait) of the whole team. You also see that Dorothy is far and away the best character judge (on this trait). Her error is only eight-tenths of one point. But you see that while she was a good judge of others she was only a moderately good judge of herself, since she over-estimated herself 1 point above the estimate of her by the team. This is pretty good self-estimate, however, and if Dorothy does as well on all the other sixty-two traits as on this one of popularity she is one of those rare persons who is a good judge both of

herself and others. You see just above Dorothy is Philip who is a poor judge of himself as he missed himself 4 points. But Philip is a good judge of others as he missed them only 1.1. A little below Dorothy, Jack comes in also as a poor judge of himself, missing himself by 3 points. But he is a fine judge of others, ranking in this respect next to Dorothy. Indeed, he is the second best judge of other people on the whole team.

One point of great interest is Donald's high degree of error. As you run along his line from left to right you see it is all ups and downs—big ups and big downs. He is away wrong on nearly everybody. But notice that Dorothy's line runs pretty close to zero all along. She rarely misses her judgment on anybody. Indeed three of her judgments were perfect—that is, they agreed exactly with the combined judgment of the entire team. Now Donald's judgment is so poor that he might as well have tossed up a coin to see how he would set each person down. In fact, he probably would have done a little better by matching pennies because his judgment is worse than mere chance.

It would be too complicated to unravel why this is true, but I shall ask you to take Professor Adams' statement as a statistician that if your average error of judgment goes more than 2.8 points above or below that of your team either in rating yourself or in rating others you might as well toss a coin to see how you should judge either yourself or other people.

One thing you should notice from the total average errors in the right-hand column is that as a rule people go much further wrong in estimating themselves than in estimating other people. This means that as a rule we judge other people better than we judge ourselves. In fact, in one-half of all the self-ratings, tossing a coin would have been just as good. This shows

the enormous value of having a team-rating of your personality and character. On the other hand, however, you see many of the poor self-raters are excellent other-raters, and vice versa. Professor Adams says that if you do not miss your judgment of yourself or others more than 1.3 points your judgment is extremely good. You see that nobody except Ted, Lucile and Dorothy were that good on their ratings of themselves; but in rating others we see that Philip, Dorothy, Jack and Kathleen are all inside the 1.3 limit and are therefore good judges while Ted and Sam are close seconds. Jack misses himself by a minus three points but judges others extremely well, missing them by only 1 point. Virginia is a rather poor judge of both herself and others, but Kathleen is a poor judge of herself and a good judge of others.

Of course you will recognize that I have been here merely taking the rating on "popularity" as a sample. But it happens to be a very good sample. It illustrates well both the entire method and the method of obtaining the final results as to whether you are a good or poor judge of yourself and of others. On this point Professor Adams has found that his records of over fifty thousand ratings prove that about ten per cent. of people are good judges both of themselves and of others. About eighteen per cent. of people estimate themselves with absolute correctness. This does not mean that there is any one person who never makes a mistake about himself. It does mean, however, that if you take several hundred or thousand estimates that people have made of themselves and compare them with hundreds or thousands of estimates that nine others have made of these same people eighteen per cent. of the two sets of estimates will be in exact agreement.

Professor Adams next finds that if we exclude the

eighteen per cent. of people who judge themselves correctly, fifty-six per cent. of the remainder over-estimate themselves, and forty-four per cent. under-estimate themselves. Taking the whole series of fifty thousand ratings, however, he finds, on a scale of ten points, that about forty-six per cent. of all people can estimate themselves within one point above or below the average estimate which other people place upon them. The remaining fifty-four per cent. will either over-estimate or under-estimate themselves by a wider margin. However, about sixty-three per cent. of people can estimate themselves within two points of the team average, which is not a very bad self-estimate.

CHAPTER VI

HOW WE JUDGE OURSELVES AND OUR FELLOW MEN

(Concluded)

VI

Now the final question is, *What do all these judgments of character mean?* What do our judgments of character really tell us about ourselves and others? It seems to me that Professor Adams has answered this question with some of the most amazing revelations of human nature that have come out of present-day psychology. These revelations will appear clearly if you take the kind of people who over-estimate themselves and compare them with the kind of people who under-estimate themselves.

"The most outstanding thing," said Professor Adams, "that over-estimation of yourself means is stupidity. Take those people whose estimate of themselves on these sixty-three traits is on the average too high and you find that their comrades almost uniformly place them away below the average on the traits of common sense, observation, intelligence and sense of humor. You can call it either egoism or egotism, but the "swell-heads," as we call them, are consistently rated by their team mates as being stupid. It is highly probable that such a person is merely trying to bluff himself and others into a belief in his superiority although he knows that he is in reality below the average.

"The next most important thing we find about the egotist, after his comrades have combed his character with this fine-tooth comb with sixty-three teeth in it, and have carefully thought him over for a whole month and then combed him again, is that they steadily and consistently vote him as 'unsympathetic,' 'lacking in courage,' 'of a pessimistic disposition,'

'stingy,' 'inconsiderate of feelings and rights of others,' and 'likely to blow up in an emergency.' "

Professor Adams went on to say that his results showed the following: "The man who over-rates himself is rated by others as showing a slight tendency on the average toward laziness and irresolution, he is untrustworthy, does not possess the courage of his convictions, is moody and tends to be weak-willed."

I said in astonishment: "Do you mean to say, Professor Adams, that we can emphasize these things as being the usual characteristics of the swell-head?"

"You can. They are away past chance. Not only that, you can say that such a person is as a rule not interested in other people as persons. He makes few real friends. He is a poor judge of human nature. The man who over-estimates himself on these traits is a poor judge of how other people stand on these traits. He is a poor judge of other people. He does not try to oblige or put himself out for others. He knows too little about others, thinks and cares too little about them. He is, as a rule, undemonstrative, tactless, impolite, self-conscious and unpopular. He tends on the whole to be narrow-minded.

"Now you must understand that the man who under-estimates his own powers and traits is usually just the reverse of the fellow who over-estimates himself. Taking these 50,000 ratings, of which 10,567 are self-ratings, they show that the person who under-estimates himself, is voted by his comrades as being more courageous than the average person. They vote him as being endowed with greater observation, higher intelligence, more generous, of a more joyful disposition, keeps his head in an emergency, does not give up so easily, is more resolute, more trustworthy, has greater strength of will, is more interested in other persons, likes to be with other people, has a

much better knowledge of human nature, puts himself out to be agreeable to others, is not self-conscious, tends to be popular, is more truthful, conscientious and broad-minded.

“From the social standpoint it seems to indicate that the swell-head is an introvert and the one who under-estimates himself is an extrovert. They are sometimes thought of as being the opposite of this, but these results indicate that the popular notion is untrue. In other words the swell-head is thinking about himself while the person who under-estimates himself is more likely to care little about himself and to be thinking of others and of the world outside.

“Now if you look at the results from another angle and consider not merely the tendencies to over-estimate or to under-estimate but fix your attention on the *magnitude of the errors*, that is, how far each type of person misses it in judging either self or others, we get a somewhat different series of results. From this side we find that those who make very small errors in judging themselves are judged by their friends as having higher mental ability than those who judge others well.

“The good self-judge is ranked higher on intelligence, common sense and the other mental traits than the good other-judge. It takes higher intelligence to judge yourself well than to judge others well.

“It also apparently takes a higher degree of courage to look yourself straight in the face and judge yourself well, than it does to judge others correctly. You know Browning said a man has two faces, ‘The face he shows to the world and the face he shows to the woman he loves.’ These results indicate that he has a third face, namely the one he shows to himself. Now, the man who judges himself correctly has had the courage, ability, poise, honesty, trustworthiness, self-

command, resoluteness, common sense and powers of observation to look at his own face squarely without dodging and see himself as others see him.

“It may be, of course, that the one who judges himself accurately, knows his own powers, has a quiet confidence in himself without bluffing as the egotist feels it necessary to do. Owing to his confidence in his own powers, he may care less what those around him are thinking about him. When called on to estimate his powers on some exact scale since he is socially inclined, and extroverted, he finds pleasure in being agreeable, and this may be why he tends to over-estimate others.

“At any rate the big outstanding difference between the good self-judge and the good other-judge seems to be the greater social inclination and broad-minded sympathy of the good self-judge. Such persons possess not only more intelligence but a higher degree of the desirable social attributes, such as a joyful disposition, control of temper, lack of self-consciousness and genuine liking for other people. Since the good self-judge is your good mixer, he is thrown more with people and learns better how to understand and get along with his fellow men.

“We might explain this apparent paradox by saying that the good judge of others is likely to be cold-blooded and not interested in others as human beings. Strange as it may seem your good self-judge is not interested in himself but in others, while the good judge of others is not interested in others as persons and friends, but is all the time thinking about himself. He thus regards others as tools to use for his own selfish ends. He finds one person useful for this purpose, another useful for that, and thus develops a shrewd ability to measure other people, not as warm-blooded human beings but as mere tools. The

apparent contradiction that the one who understands himself best is most interested in others while the one who best understands others is most interested in himself thus receives a common-sense explanation. Whether this be the real explanation or not, the fact remains, strange as it may seem, as our results abundantly show, that the good judge of self is interested in others, while the good judge of others is most interested in himself and is only interested in others as tools for his own selfish use."

I believe you will now agree that I was probably tending at least in the right direction in judging the traveling man in the hotel in Toledo as I did.

"We see from this how a certain type of executive is able to judge other people accurately, because to him other people merely represent his tools. We see furthermore that the executive who judges his fellows in this cold-blooded accurate way is seldom that type of executive that has those other traits that inspire his employees with human fellowship by his warm sympathetic interest and example. He is the driver type of executive. Our results also suggest that both types of individuals, that is the good self-judge and the good other-judge, are useful in executive positions; the good other-judge to choose and hire the employees, the good self-judge to make the human contacts; the good other-judge to select, the good self-judge to train and manage; the good other-judge to direct, the good self-judge to stir enthusiasm and inspire.

"Now there are two other things of great interest here about those people who are good judges of others. When we study over the way the teams rate the good other-judges on all the traits they seem to fall into two rather distinct types. The more numerous type, as the trait ratings show, is made up of those people who observe this, that or the other bit of *action* in another

person and who think out clearly by perfectly logical, hard-headed processes what must have led the other person to do thus and so. Such a person is constantly reasoning as to *why* his friends do as they do and is constantly assigning reasons for their behavior.

“The second type of good judges of others is composed of those people who are emotionalized by the other person whom they are judging. They *feel* that the other person is so and so. They do not reason it out at all. They depend on hunches and intuition. They feel by their own emotions what must be the traits of the other fellow. Now this type is rather rare, but they are the most accurate judges of others that we have found. That sort of person, while judging others well, is very sympathetic with others, much as we found was the case with the good self-judges. Such a person does not depend upon his intelligence in judging others, but upon his feelings about them. He literally *feels his way through life*.

“I am aware there may still remain some skepticism as to the fundamental accuracy of all the ratings we have made. We have already pointed out three strong reasons why we believe them to be accurate. You remember the first reason was that the ratings both of self and others, made a month apart, were astonishing in their agreement with one another. This showed that these traits stand out as a *constant thing* in individuals so that month after month or year after year we rate them very much the same. Second, we found that they agreed more closely in rating mental and personality traits than in rating physical traits. Third, we found that the judgments of nine other persons tended to agree with one another. And this is a strong evidence that they are true. If there had been no agreement, that is, if the team had not tended to judge John or Sam or Lucile all *in the same general*

way, we would have abandoned the experiment as worthless. On the other hand, had they all agreed exactly we would have been quite sure that they had fooled us and agreed in advance what to say.

“But instead of there being either complete agreement or total disagreement the results came out in broad general agreement with just enough disagreement to show that they were honest judgments of self and others. They show that our friends know us pretty well and agree generally on what sort of persons we are, yet they disagree just enough to make good gossip. We all agree on Smith, Jones and Brown close enough to rate them pretty accurately on a ten-point scale, but we disagree enough to talk about them with delighted interest for hours at a time.

“These three great main facts therefore strongly indicate that our results are true measurements of personality and character.

“But we took a fourth method of testing their reliability which we believe sets at rest any lingering doubts as to their fundamental truth. First, for a number of teams we took their college grades, covering in all cases grades for one and one-half years and in some cases for the whole four years. In the second place, we gave all these teams an intelligence test, which was a modification of the army alpha test that was given to soldiers during the war.

“This experiment revealed two outstanding things. First, those who had good college grades proved to be the ones who were ranked high by their fellow students on the very *qualities of character and personality on which you would expect them to rank high*. And the ones who ranked low on college grades ranked low on these same traits. That is, they ranked high or low on what we might call the distinctly mental group in the list of sixty-three traits. These are

'critical insight,' 'quick mentally,' 'deep mentally,' 'general brightness,' 'common sense,' 'observation,' 'memory,' 'reads much,' and 'originality.' There was also a second group of traits on which those who won good grades stood high and the ones who won poor grades stood low, namely, 'industry,' 'steady worker,' 'truthful,' 'trustworthy,' 'conscientious,' 'courageous,' 'moral courage.'

"Now it is certainly a strong indication that our ratings were fundamentally true, when you see they agree so closely with the very traits that are absolutely necessary in order to win success in school work. Not only that, another indication can be drawn from the fact that those who won high grades did not stand any higher than the others on the average in those traits that are not so necessary to good college work. That is, some who won high grades were rated by their comrades high for being touchy, while just as many others were rated low. This held true also of such traits, as 'worrier,' 'sense of humor,' 'control of temper,' 'impulsive,' 'moody,' etc. That is, there was no *general tendency* for the ones with high school grades to be either high or low on these qualities. Every way we approach it, the ratings fall in line with expectation.

"Now, you may ask, did those who won high grades stand high on the intelligence tests? They stood a little higher than those who had low grades, but very little higher. Indeed so little that the kind of school grades they won were a better indication of intelligence than were the intelligence tests themselves. By that I mean that almost as many students did fine college work who rated low on the intelligence tests as those who rated high. But those who rated low on such qualities as industry, common sense, perseverance and the like almost uniformly had poor grades;

or, we had better say, those who had poor grades were rated low by their fellow students on industry, patience, working for the future and the like, no matter how high they rated on the intelligence tests.

“This part of the investigation proved to my mind that if a college wants to select young men and women who will make good students, their school grades are a better indication of this fact than would be revealed by intelligence tests. And I see no reason why this would not be true in selecting business employees. It showed that one who rates but moderately on intelligence tests can with industry, perseverance and the old-fashioned perspiration-instead-of-inspiration method win rich rewards in scholarship. And this is in all probability true all through human life as we shall see in a moment.

“Thus a college or business or an industry that selected its employees on the basis of sound traits of character would do better than one that selected them merely for so-called high intelligence. Indeed, an amazing fact that came out was that those students who rated high on intelligence tests, were rated rather low by their fellow students on resoluteness, will power, industry and the like. In my judgment, if a college or a business selected its people on intelligence tests as their main requirement and paid little attention to these other character traits, it would soon find its ranks filled up with lazy, irresolute, slothful, foolish, playful, indolent slackers. Intelligence tests have their value, but even intelligence, in my belief, is better measured by the long steady pull of school grades than by a brief intelligence test; and good school grades are in turn highly indicative of those fine traits of character that we most need both in college and among our citizens.

“As a proof that this holds true as I said a moment

ago in human life as well as in school, a few years ago, Prof. Guy M. Whipple, here at Ann Arbor, gave intelligence tests and a good many character ratings to a considerable body of students who had failed in university work. He found that only six per cent. of them could be said to have too little intelligence to do college work. Lack of intelligence was rarely the cause of their failure. *Then why did they fail?* Why do people in general fail? Is it lack of intelligence? I do not think it is often so. Twenty per cent. of these students failed for good reasons, such as lack of money, ill health, needed by the folks at home, and the like—things that the student could not control. But *eighty per cent.*—who, mind you, *had plenty of intelligence*—failed from the following causes: did not work hard enough, had too good a time, spent too much money, and things of that sort. In short, the traits they lacked were industry, will power, perseverance and the many other invaluable traits of sound character.

“Let us turn now from this little world of success and failure inside the college to the big world of success and failure revealed by a study of Dunn and Bradstreet’s investigations of manufacturers and business men. After nearly half a century of studying the causes of human success and failure Dunn and Bradstreet state that twenty per cent. of failures in business are due to things beyond the control of the individual, such things as changes in style, money panics, changes of trade routes, floods, bad crops and those things which the insurance companies call acts of God. But they state that *eighty per cent. of all failures in business are due to things the individual can control.* They are due to such things as lack of perseverance, industry, caution, getting along well with employees or customers, lack of firmness, and those traits of personality and character that the indi-

vidual can develop in himself to a very high degree if he only takes hold of himself and perseveres.

"I do not mean to say that a man can make himself all over. I sometimes think he can pretty nearly do even this. But I am certain, as a psychologist, that if you are not working hard you *can* work hard, if you are not punctual you *can* cultivate the habit of being punctual, if you are not controlling your temper you *can* control your temper, if you are not going at things with will power and determination to win, you *can* develop enormously your drive and will to win. Success is not something that nature hands you all done up in a nice package, labeled intelligence. Success, in the main, is the outcome of the steady exercise of those traits of character and personality which can be to an almost unbelievable degree developed by the individual himself.

"In fact it seems to me we may well look at ability or effective personality as a five-sided figure. On one of the sides let us write Mentality; on the second side, Physique; on the third, Emotional Control; on the fourth, Will Power; and on the fifth, Social Intelligence. A considerable degree of all are necessary to a well-rounded character. Without mentality you have the moron, without a good physical make-up you have the invalid, without emotional control you have insanity, without will power you have the dreamer, and without social intelligence you can not do team work with other people. Now these sixty-three traits cover practically all of these factors in human personality. You might extend them to one hundred or one thousand but you will find it hard to do so without duplicating one or more of the sixty-three. And you can very greatly develop every one of these sixty-three traits in yourself if you will.

"It seems to me, therefore, that nothing could be

of greater value to any one than to rate himself and have his comrades rate him on this large list of traits which pretty well covers the human personality. It will show him how he stands in his own judgment and how he stands in the judgment of his acquaintances, who, as we have seen, often know him far better than he knows himself.

“And I will add that if high-school or college students or office employees or friends anywhere will form teams and have a team leader do the larger share of the simple calculations necessary, I shall be glad to aid them all that is in my power. I do not have a clerical force at hand or I would urge teams to be formed everywhere and merely send me the ratings and I would gladly chart out a complete profile of character and personality for each individual. In order to be of permanent value, however, for me, in working out character standards for colleges and employers, I should be forced to ask all teams to rate themselves over again twice as I did with my students here and send me both the ratings. I should also be forced to ask such teams to pay all postage charges.

“If I could secure a number of such teams throughout the country it would give me what seems to me would be one of the most valuable things we could have in the United States, that is, *definite general standards of character and personality*,—standards made up not merely from college students, but from the soda-fountain boy, the bank clerk, the elevator boy, the garage mechanic, the farmer, lawyer, doctor, butcher, and all the different kinds of people that it takes to make up the world. If some one could endow such a research, and the cost would not be great, I think it would be of national moment and of value to every employer and to every college and school in the United States. But every person who will simply

form a team among his friends and work out his character and personality ratings with his local team leader I am sure will find he has a document that will be of benefit to him as long as he lives.”

On the following pages is the list of sixty-three mental traits on which Professor Adams secured over fifty thousand ratings. You can use ten or thirty or all of them as you desire, although the more that are used the better. In case you should form a team and secure the cooperation of Professor Adams you must form a team of nine persons besides yourself, elect a team captain to make the main body of calculations and use all of the sixty-three mental traits; you must also make two ratings, allowing several weeks to elapse between the two ratings. The calculations involved are the simplest kind of eighth-grade arithmetic; it merely happens that there are a good many calculations to make in order to secure accurate results.

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CHAPTER VII

WHAT ARE YOU AFRAID OF?

PERHAPS no one has in recent years enriched clinical psychology—the general psychology of mental adjustments—more than Dr. David Mitchell. He was born at Aldershott, Canada, in 1884, and graduated from the University of Toronto in 1910. He received his Doctor's Degree from the University of Pennsylvania in 1914, and from that date until 1917 was instructor in psychology at that institution. From 1920 to 1927, he was professor of psychology at Rutgers Summer School, and is at present professor of educational psychology in the New York University Summer School. He carries on an extensive range of activities, among them the conducting of psychological examinations in various public and private schools in and about New York City. He also has a very large private practise as a consulting psychologist, his work here being in the field of both mental adjustment and vocational guidance. He has devised numerous original methods of bringing about healthy adjustments in people whose minds and nervous systems are normal but who need scientific assistance in meeting the problems of life and work. In the following interview, some methods of mental adjustment are described which any one anywhere can put into practise.

VII

WOULDN'T it be fine to wake up some morning and know that you were not afraid of anything—that there was nothing in the world to be afraid of? Gone would be your dread that the children would get sick, or the house would burn down, or that some day you would go insane, or that the crops would fail, or that you were going to “fall down” on your job!

You would no longer apprehend that the queer feeling in your stomach was cancer, or that the pain in your side was appendicitis, or that your occasional little difficulty in getting your breath was heart failure. You would not worry over getting old and not having money enough to keep you from the poorhouse. There would be no distrust that you were not going to be equal to making that speech, or writing that letter, or meeting your customer or your boss or your employees. Nor would you have that vague general apprehension of impending calamity that so many people carry through life. Could anything be closer to heaven on earth?

And, then, wouldn't it be still finer to *know* that you were *never* going to be afraid again?

Well, all this can be true. Of course, your children *may* get sick, and your house *may* burn down and your business *may* go to pieces. Those things do happen sometimes to the bravest people. But I am talking about your not being *afraid* that they are *going to happen* and not being concerned in the least unless they *do happen*.

The only person in the world who can give you such a fearless state of mind is yourself. And you do not

have to get it by gritting your teeth and going through things in spite of "hell and high water"; you do not have to do it by working yourself up into some highfalutin hypnotic state; and, you do not have to do it by inducing in yourself some sort of somnambulistic coma of the "sub-conscious" or "unconscious,"—whatever those things may be. You can do it by applying plain common sense to every-day life and its situations.

You don't have to take my word for these surprising statements. They are not mine. They were made to me by Dr. David Mitchell—one of the greatest authorities on mental matters in the United States. For nine years Doctor Mitchell has been a practising and consulting psychologist in New York City and he has done twenty years of laboratory work in the same field. He speaks from his extensive experience as a university teacher and a public lecturer on psychology, and he has the authority of his position as president of the Consulting and Clinical Psychologists of New York State and Chairman of the Clinical Division of the American Psychological Association.

Recently I took a two-day automobile trip with Doctor Mitchell and his wife, exploring the highways and byways of Long Island, testing its bathing beaches, and enjoying its beautiful hills and sea views. I found Doctor Mitchell as expert a camper and as fine a swimmer as he is a psychologist, and able to wash dishes with sand without a drop of water, until they were spotlessly clean—a feat which astonished and interested me about as much as his amazing knowledge of the human mind. I mention these facts because I concluded that his success in getting at the innermost workings of people's minds was due partly to his technical training, partly to his originality in devising new methods of psychological analysis, but also to the fact that he himself is a big and broad-minded

person, with rich understanding, human sympathies and an immense experience with the deepest needs of every-day human nature.

And after we were back in New York and had rested over a good dinner, I said: "Now, Mitchell, I want to ask you about a remark you made when we were standing on the edge of Montauk Cliffs. You will recall that I told you it made me sick with fear to stand on the edge of high cliffs, towers and canyons. You replied: 'All your fears—except two—are fears that you have learned and you can *unlearn* them. That applies to every normal human being.'

"Now if that is really true, it seems to me it is a turning-point in human happiness. Tell me all about it, so that I can give the message to others."

In response to my request we went into Doctor Mitchell's office. He got down a big bundle of records from his files and for *five solid hours* he talked an uninterrupted stream of the best and soundest psychology of happiness and efficiency I have ever heard. And during all that time, and during all the days and hours I have since spent with Doctor Mitchell, I never once heard him mention the "sub-conscious" or the "unconscious," or the "subliminal self" or any of all the vague and ill-defined nebulosities through which popular psychology, it seems to me, has filled many people's minds with "complexes" that have only added to, instead of clarified, the mental confusion which is the curse of so many human lives.

I mention these things on my own responsibility because it seems to me that many people to-day are being led to believe that they have to attain some mysterious "will power," or some particular spiritual "contact," or some unbelievable power of "concentration," or "relaxation," or "harmony," or

something of the sort in order to find their way to a healthy and happy mental life. Doctor Mitchell does not sympathize with these views. He believes you can attain mental health, happiness, efficiency, self-confidence and self-control by much less elaborate and mystical procedures. He believes you can educate yourself to become free from fear and the feeling of failure by building up simple and ultimately fool-proof systems of *habit* which will make fear and failure a practical impossibility in your life.

But let us go back to the beginning of the interview.

As we sat down in his office, Doctor Mitchell said: "Practically all the fears that people ever have are *learned* fears. There are hundreds of ways by which people can *learn* to be afraid but the original, intuitive fears—those we are born with—are *only two*, as Dr. John Watson has shown clearly. One of these is the fear that follows a loud sound and the other is the fear that comes with a sudden withdrawal of support. If you hold an infant in your hands and suddenly pull your hands away, letting it fall back on to the pillow, it will cry with fright. You get the same response if you drop a steel bar, or slam the door near by, or allow a dog to bark in the room, or if you make any other loud noise. Fright from these two stimuli seems to be *natural*. As an experiment, Watson tried in hundreds of other ways to frighten little babies, from the day they were born until they were several months of age, and he was unable to find *anything* that would frighten them, unless it was accompanied by a loud noise or placing the child so it felt in danger of falling.

"We can then, I think, assume as a fundamental fact of human life that all fears but two are learned fears. If they are learned, they can, like anything else, be unlearned. And that is a large part of my

business as a consulting psychologist, namely to teach people *how to unlearn their fears*."

"Well," I broke in, "do you mean to say that if a child had the right training, if nobody ever talked fear around it, if it were never frightened, it could grow up to a life entirely free from fear?"

"Absolutely! I've seen it done," replied Doctor Mitchell emphatically. "Just now I am thinking of two boys, one of them fourteen and the other sixteen, whom I have had under my supervision as a sort of godfather for more than ten years. And these two youngsters, as far as we can possibly find out, are absolutely fearless. They have, I believe, never known the emotion of being afraid for a single moment."

"That sounds like a fairy tale," I exclaimed in astonishment, "but if they are not afraid, what would they do if they were in real danger?"

"Well, they would do just what you do a hundred times a day without knowing it. They would endeavor to get out—but they would not get scared. They literally *don't know how to get frightened* because they never learned how. They have no *habit system* for fear built up; indeed, they do not possess the mental and nervous machinery for fear.

"Now, you are in the same situation a hundred times a day without knowing it. You are in danger every time you walk up-stairs, but you never stop to think of it as being dangerous. Statistics show that a great many people have slipped going up-stairs and broken their necks. But you don't keep thinking of that and so you are not scared. Some people, however, *do* think of it, and they are scared.

"It isn't dangerous to stand on the edge of a cliff unless you do something that you would never do ordinarily—unless you lose your balance or jump.

"Let us come back to these two boys. Let us see

how they meet situations which fill many other persons with unutterable fear.

"Recently the fire fell out of the furnace and set the coal bin on fire. Now many a boy, who had been taught to be afraid of fires, would have run away, panic-stricken, and wasted time and possibly let the house burn down. The younger of these two boys, when he saw the coal bin burning, had none of the confusion of mind caused by fear. Instead, he rapidly took measures to put the fire out. Afterward, he barely mentioned what he had done and spoke of it as a simple matter of fact, just as if he had kicked a stone out of his way on the sidewalk.

"Take another instance. Very few boys of thirteen or fourteen like to sleep in a big house alone. Indeed, some boys grow frantic at the thought. But these two boys do so without *thinking* of being afraid. Moreover, they go out at all hours of the night and never think of fear."

"Well," I said, "maybe that is just because they are naturally courageous."

"Oh, no, you are looking at courage wrong end to. The kind of courage they illustrate is not a manufactured desperation, it is an *utter absence of fear*. If one has never been taught that there is anything to be afraid of, one is never afraid.

"The simple fact is that the parents of these boys have done a most admirable job. They have carefully avoided ever mentioning fearing things themselves or intimated that there is anything which would cause the boys any alarm.

"Later I am going to tell you a number of stories to show you what a contagious thing fear is. It is more 'catching' than smallpox. And just as we never get smallpox or pneumonia or influenza, except by catching them from others, so we never acquire fear

except from others. And just as some people are somewhat more susceptible to smallpox or other infections than others, so some people learn fear more readily than others. There are individual differences, but all this does not alter the fact that the more imaginative, sensitive person has only two natural fears and the rest are all learned. In the case we have been discussing the parents never *taught fears* to the two boys."

"Well, did they never punish them?" I asked. "Punishment sets up fear in children, does it not?"

"It's all owing to how you punish them," replied Doctor Mitchell. "The parents of these two boys punished them at times, but they never caused them physical pain or even threatened them with it. They never held up 'bogies' of policemen or dark closets or whippings for instance. Instead, they deprived them of certain things which they liked very much.

"Of course, these boys are blessed with peculiarly sensible parents. They can thank God for that. Much of the fear and indecision that curse people has been unwittingly planted in their hearts by the parents. Their parents may never have tried to alarm them, but the parental attitude toward life was in itself sufficient.

"Most parents not only have fears for their children, but they talk about their own fears. They fear that the children will fall into a pond and be drowned, or get run over in the street, or catch some disease, and, when they have finished warning the children, they are as likely as not to start discussing the disasters that may overtake other members of the family.

"I recall the case of a fifteen-year-old boy whose parents would hardly allow him out of their sight. He was attending a private school as a day pupil. They would see that he got away from home in the

morning just in time to reach the school, and they would require him to be back in just as short a time as possible to cover the distance, and then he would have to sit around the house. At the school they made all sorts of special arrangements for the boy. They would not let him go into the swimming pool lest he drown, and they sheltered him from all rough activities. The boy found out some of these arrangements, and of course that made him more afraid. Finally, this continual worry, the demand that he come right home, the fear that he would get hurt or drowned, worked into his reactions so that when the time came for him to make his own decisions he did not know what to do.

“By the time he was fifteen and ready to strike out for himself a bit he was almost a total loss. Although stronger physically than the average boy he was really a weakling because the great thing his parents had built in him was a lack of confidence in himself. His parents had already set him on the highway to failure and nothing but a long process of reeducation could ever save him. ‘What can I do safely, what can’t I do safely,’ had become his constant mental queries, creating a continual state of doubt, fear and lack of confidence.

“Take any situation where there is the slightest conceivable danger, such as running an automobile, a thing which properly trained boys take hold of without thinking of danger. This boy, when he was first sent to me, would not dare try it. He was afraid that something might happen.

“I had to point out, of course, that things were always happening and we had to take *some* little chance in life—but that was not nearly so bad as failing to face life at all.

“My big job, however, has not been with the boy, but

with the parents, reeducating them so as to take away the atmosphere of fear and worry from the boy. My big job is nearly always with the parents in these cases of fear. I have this set of parents pretty well in hand now, and they are doing the best they can to repair their folly. But it is a slow process, for they have had fear ingrained and drilled into them from *their* parents, who got it from *their* parents, doubtless, and so on back to when Adam and Eve told little Cain and Abel that they could hang their clothes on a hickory limb but they mustn't go near the water. I believe that this boy will come through all right, but it is going to be a hard pull.

"Just to illustrate further the damage that parents can do I want to tell you the story of a woman who had that very common fear—the fear that she would find a burglar under her bed or some other place in the house, when she returned home at night.

"Of course"—the doctor smiled—"this fear is most ridiculous. I suppose that not more than one person in ten thousand ever saw a burglar (and knew it) and yet you would think from the way these people act that at least three houses out of five were burglarized every night of the year. I have a number of such cases now, but the one I have just referred to is that of a woman of twenty-two. She was in such a hysterical condition when she came to me that one would have thought burglars were going to make a mass attack on her house every night.

"Now, I went back into that woman's history to try to find out where her fear all started. For there is *always a beginning somewhere to every fear you have*. I probed and probed but for a long time I could find nothing. She could not remember ever having been frightened by burglars or having seen a burglar.

"Finally I discovered that when she was a child her

mother would double-lock the street door, then make the usual round looking under the beds and closets, as though burglars made these places a frequent resort, and then finally lock the girl's bedroom door and look under the bed to make sure there was no burglar there. Of course, the child grew up with the idea that burglars were about as common as flies in the summer-time. And now here she was at twenty-two years of age, so paralyzed at night from the fear of burglars that she could not sleep or live a normal life, although she has never caught sight of a burglar in all these years. And all because of the mother's foolish attitude! It has taken a long time to help her to master herself and her fears."

"You spoke of this fear of burglars as being very common," I broke in. "Tell me, what is the worst and most common fear you have to deal with?"

"The fear that 'I will not make good,' " answered the doctor instantly. "That is the greatest and most common fear of all. Every psychologist's office is full of people who are burdened with it. Of course we have all had a fear we would not make good at times and in certain situations, but with these people it has become so chronic that it crushes the heart out of them, makes them ill, wretched, inefficient."

"Does this fear always go back to childhood?" I asked.

"Not always. Sometimes it has been drilled into people later. Usually this comes from the demands we make on people to try things which are beyond their physical, mental and temperamental capacities.

"Our schools are the greatest offenders in that respect. They require children to do things which we *know*, by mental, physical and temperamental tests, well over fifty per cent. of them can not do. These children can do other things just as important—in-

deed, far more important for the kind of lives they are going to live, the kind of work they are going to take up. But because of standards so high that over half of the pupils can not reach them, our schools set up in children the feeling and habit of failure. The children get the attitude, 'How am I going to get through this?' Usually they don't and can't. They do their best and fail and soon are filled with all sorts of fears and feelings of inferiority, which spread over a large area of their lives.

"I recall the case of a boy who was about nineteen when he came to me. For some time he had been out of a job. Since leaving high school he had had several jobs, but had quit each one. He gave very obvious reasons why he had left each job—sometimes that he wanted to change, or that he believed he would do better at some other kind of work, etc. But, I was not quite satisfied, and I finally found out that each time before he had quit a job there was looming up in his mind a picture of a situation ahead of him that he was not going to be able to handle. In short, he felt that soon he was not going to be able to make good. So he "got out from under" and deceived even himself about his real reasons for leaving.

"As I questioned him still further, it became clear that he would have been able to master most of these situations if he had not dodged them; but I found that too many demands beyond his capacity had been placed on him in school. At that time he had formed the habit of looking ahead with fear. This was a typical case, and one that was capable of being handled without undue difficulty.

"I think modern psychology has abundantly proved that practically every one can do far more than he thinks he can do. The lack of confidence people have in themselves is astounding, as is their failure from

this cause to do the things they are quite able to do with ease and the pride of success.

“Strangely enough, some of the incompetent people are those who brag most about what they can do. A man who brags on himself, nine times out of ten, is not doing nearly so much as he could, but he is afraid he can not do what is expected of him and so he brags as a compensation for his fear. I heard a good epigram the other day which describes this perfectly, ‘Your brags express your fears.’

“About ten years ago I had as an assistant a man older than I by some fifteen years. He had come into the psychological field late in life, but was doing good work. I confess, however, that he irritated me. You could not tell a story of anything unusual you had ever done, even to buying a shirt at a good bargain, but that he instantly tried to overshadow you with a better story or example of his own.

“His failing at last became so pronounced that some of my associates got up a party at which each one was to tell a little bigger exploit than the previous man. By the time it got around to him he was for once, as we say, ‘backed to a standstill.’ This experience made him catch on to himself a little and he adjusted himself somewhat.

“I found out that he had been doing this, largely unconsciously, to try to cover up his own doubt and fear that we would think he was lacking in ability. He had to beat us to it, rather than let his actions and achievements speak for themselves.

“He was really a capable scientific man and had enough achievements to give him a creditable standing. But he was always in fear of his *prestige*.

“Watch the man who brags and who tries to overmatch every story or statement you make, and always he is a man who is afraid he can not measure up.

When you hear two women discussing their hats or dresses, you will notice that, as a rule, neither one is downright interested in the other's clothes but is only afraid the other will prove that her clothes are superior. Of course, many people are genuinely interested in other people's successes and failures, but I must admit that an enormous number of them are just a bit more interested in other people's failures than in their successes, because it releases them from the fear that maybe they are inferior. Another person's failure gives us confidence in our superiority."

"I remember your telling me some time ago of a big executive who came to you because he was afraid to meet his directors, salesmen and his subordinates generally. Did he fall into this class?" I asked.

"Well, he was a typical example of the many persons who get afraid to meet other people. And fundamentally it is just that underlying fear that they will not make good. This man is one of the biggest executives in America. He has an income that runs into six figures and yet he sat here in my office like a whipped dog and confessed that he was in mortal terror of meeting his subordinates, and was afraid that he would have to retire and give up the fight.

"This man's job makes it necessary for him to meet the treasurer of his company, other officers and the managers of his factories and decide the big matters with them and determine policies for them, when they are wrong or lack initiative. Yet, he told me, he never went into one of the conferences without his heart fluttering, his breathing getting hard and his wondering how he was going to get through. His underlying fear was this, What is he thinking of me, what sort of impression of me is he going to carry away? He has often postponed important conferences with men solely because he was afraid to meet them.

“Now where did all that begin? What was the original cause of such an absurd fear in a big, strong, able man? Well, he told me his story and that *reveals where it started*. His father was a fairly successful man in terms of making money, yet, in all his contact with his family, he was the great lord who would not permit any judgment contrary to his own. I have little doubt that this arrogant egotism in his father was in reality a fear that he might be adversely criticized if he permitted discussion. He would not allow any action by the mother or children that he did not thoroughly approve. He vetoed any plan suggested by any other member of the family just because it did not come from him. The prime thing of all this was that the father kept his boy absolutely dependent on his own will. You can not do anything worse for your children than to keep them dependent on you for all their decisions. Instead of weaning this boy away from dependence on his father, a dependence which is proper for youngsters of three to six years of age, if not carried to extremes, but which is decidedly disastrous for children fifteen or sixteen years old, this father kept his boy under him and dependent on him long past that time. I shall have more to say about teaching children self-reliance and independence later. It is one of the biggest things in a child's education.

“This boy, for example, liked to play games but the father made a coward out of him by refusing to let him play football one day after he got an insignificant injury. He had to carry his arm in a sling for a day or so, and his father vetoed his playing in an important match that was coming on. The boy had recovered, but the father had instilled into the son a terror of the game—that it was extremely dangerous and he might get killed and all that. Well, in order to find

some excuse and make good with the other boys, he invented excuses, and soon at another big match he pretended to be sick and got out of going on the field.

"Now that one experience grew and stayed with him for years. Every time he had to meet something that called for decision and initiative, he got scared for fear he couldn't make good; and the fact that he had sneaked out of a big game made him try to sneak out of important engagements. He developed a habit of dodging and sneaking out of every difficulty he could. He had long ago forgotten the original occurrence when I saw him, and when he came to me to help him get over his big fears as a famous executive he hadn't an inkling that there was any connection between those football games and his present form of fear. He had no idea that to-day he was sneaking out of a meeting of managers and salesmen because he had that day sneaked out of a big football game.

"But as I talked with him and made him describe *exactly* how he felt when he was preparing for these meetings I made him see he was simply reliving that old experience. It was a big revelation. But when a sensible man like that sees clearly the cause of his mental difficulties, that alone is about the end of my job. He came to see me frequently for several months after that and showed constant improvement. He grew more calm and confident with each talk we had until in about five months he felt entirely able to handle the situation by himself. Since then he has apparently been going strong and having no more difficulty. He was an entirely new man when I saw him last and his old fears had disappeared or were rapidly fading. In time these people get to a point where they can not even *imagine* themselves afraid of the things and situations that formerly filled them with forebodings and terror."

"You told me last year," I said, "about a big woman executive you had been working with who had a bad case of fear. I am sure many readers would be helped to know the details of her case."

"Well, there is a bit of the psychoanalytic point of view in this case, and you know what I think of a good deal that is called psychoanalysis. But her case was certainly difficult. She was forty-six. When she came to me for the first time, a little more than three years ago, she could not stay alone—day or night. She would go frantic with fright if left alone. She was running an important business and is yet; her net income was well over thirty thousand dollars a year. Her business compelled her to make frequent trips around the country where she had to stop at hotels; but she was so deathly afraid of being alone that she had to arrange in these towns for some one to be with her day and night when in her room at the hotel. She came to me just as she had given up an important business trip which promised large returns, because she feared she could not get a satisfactory person to stay with her at the places to which this trip would take her. No doubt, giving up this trip cost her several thousand dollars.

"Now by a long process of inquiry I finally put my finger on the cause of this fear that was ruining her business and her life. It all went back to just *one* situation when, as a child about eight years old, she had seen her sister do something which was not acceptable socially. She had no clear idea of its significance, but sensed that her sister was doing something that was wrong. Naturally she would have spoken of it to other members of the family, but the sister, who was a grown woman, threatened her with all kinds of calamities, even violent physical injury, if she told anybody. The child had a sense that she ought to tell,

and yet, there was her sister's constant threat of dire punishment if she did tell. The threats made her keep the secret within herself, and she went about as a child with this unhappy mental conflict. It remained in her mind like a festering sore.

"Years ago, before our methods of psychological analysis were developed, no one would have believed that such a trivial childhood fear might color one's whole after-life. But here was a clear case where a trifling incident was pretty nearly wrecking a woman's life and business. In time, of course, she forgot all about the original *particular* occurrence, but the *general* fear stayed with her. It even finally took the form of ghosts,—the fear that something terrible was coming and was going to do her damage,—and she would lie awake at night and would feel that some cold, clammy hands were just reaching out of the air to grab her. Alone in her room she would not dare to turn out the light, nor close the door, because these overpowering presences that were going to do her damage would come flocking in."

"But, my dear Mitchell," I remarked, "I don't see how you get these people to tell you such inner mental secrets, nor how you would go about unearthing a thing like this which she, herself, had entirely forgotten."

"Well," replied the doctor, "after getting a person to engage in easy conversation until we get at bit acquainted, I lay before him, as tactfully as possible, that there is no use whatsoever in his coming to me unless he is perfectly willing and ready to go the limit of frankness. I explain that I have no microscopes, chemicals or X-rays by which I can analyze or probe his mind; consequently he simply has to lay all his cards on the table, and the cards must all be there, where both of us can inspect them. I try to make him feel,

'Here is a person who understands. I can tell him everything.'

"And, in this woman's case, after going considerably into her past life, I asked her one of the great questions I nearly always ask persons who are having chronic fears; it is a crucial question with me and often reveals even to them astonishing things. I ask them the question, 'What is there in your life that you are ashamed of?' I assume that there is something, and it proves true in a majority of cases. Just go back for a moment to this big executive sneaking out of that football game—you see, it was something that he was always ashamed to recall and which he tried to forget; and it is a characteristic of the mind that it tends to forget painful experiences and remember pleasant ones.

"Of course I don't ask this question until I get their minds prepared. Oftentimes they will not answer. Then I put it this way, 'What are you *most* ashamed of?' Often again they don't say anything except that they don't know. And I come back with, 'Is there anything that you regret?' 'What was the last situation in which you were afraid?' 'When you were afraid last, what were you thinking about *just then?*' And I make them reconstruct as nearly as possible both their actions and thinking at that time.

"Then I follow this up by insisting that the next time they feel this fear or dread they must write out the story telling exactly what they had been doing and what they had been thinking just prior to or during the experience. I often have them write out a dozen such stories, indeed sometimes thirty or forty, describing different situations when they have felt this fear. And then, as I go over the stories, I pick up a little suggestion here and a little suggestion there, and in this way I can usually piece together a connected story which reveals to me a great deal. You see, I get

in this way the scattered elements of the situation and gradually reconstruct their mental attitude. And it takes a long time with some of these people, with others not so long.

“Well, I took this woman through this and other processes, and, as she was a sensible person, I had her, within a period of three months, so much improved that she was sleeping entirely alone. She soon realized that these fears were pure ‘hangovers’ and she thought to herself, ‘I know there is nothing in these situations to be afraid of, so I am just going to lie down quietly and go to sleep.’ After a few months of effort she succeeded. Very soon she began going off on long business trips alone, and for nearly three years she has done this and never feels any fear or dread about them. She takes things as they come, as a mere part of the day’s work.

“For instance, you remember the other night before you and I started out on Long Island, what a terrible night we had in New York and all over the state; you remember there was fierce lightning and thunderstorms and terrific rains all night—one of the worst nights in New York for years. Well, that night, that woman started from New York at nine o’clock and drove through those storms *all night* over two hundred miles up through lonely roads of the Catskill Mountains. It might have taken a bit of nerve for you or me to do that, yet she did it, and did not even *think about being afraid!* It is all a matter of *thinking*,—you can’t be afraid if you don’t think about being afraid.”

“Well,” I said, “that is surely a triumph of self-mastery. Don’t you believe, Doctor, that the reason people do not master themselves and master life is because they *just don’t know how?*”

“Yes, partly that, and, partly, they have had so

many, many fears, doubts, dreads, and so much feeling of failure implanted in them from the cradle up that they just can not imagine themselves any other way. Most people simply can not imagine a life without fear, and yet it is possible for everybody."

"I suppose," I interjected here, "that one of the chief things you do is to tell them they must build up and use their will power to overcome these things."

"Not a bit of it," Mitchell replied with just a tinge of sarcasm. "Maybe you have noticed that you have probably never heard me use the term 'will' or 'will power.' I don't believe in what is popularly called 'will.' Most people imagine that 'will power' is some mysterious mental pep or jazz or dynamo that they can summon by some supreme effort out of the nebulous nowhere which adds something to their own strength or powers. I do not accept that view. I believe it does not represent our best psychology. It belongs to what we might call the theological period of psychology.

"Will, in my belief, is a system of habits. You can greatly strengthen your self-control, your mastery of your powers, but you do it, not by some supreme inner effort of 'concentration,' but by exercising a long series of choices of the right action instead of the wrong action. In other words you build up habit systems by right choices in the direction in which you wish to grow, and these habit systems are your most powerful aids when moments of hesitation come—when there is a choice between acting in one way or in some other way. By acting in the right way these habit systems grow so strong that nothing else can get in their way. They literally head off any thoughts of doing any other way except the right and desirable way. And when you have these habit systems strongly developed and ingrained you have what you may call, if you like

the term, a strong will. But you can not get a strong will in a minute. You must constantly fix your attention on the desirable thing and let nothing switch your attention off of that thing. In this way your will, or rather your desirable habit systems as I prefer to call them, becomes so strong that, in time, without hesitation you express the whole force of your personality in the desirable direction. That to me is a strong 'will.'

"For instance, in getting rid of fear habits, you can not do it by some supreme and sudden effort of what is commonly called 'will power.' *That only centers your attention upon it and makes it worse.* To say with violent effort and determination, 'I just will not be afraid,' is not a particle better than saying, 'I just *will* worry,' or, 'I just *will* be afraid.' You might as well say, 'I am determined to worry,' as to say, 'I am determined not to worry.' You have centered your attention on the worry or fear, just as much by one form of statement as the other. You see, instead of overcoming your fear and worry by setting up a *new train* of action or thinking, you are by this method merely magnifying them all the time. In short, there is no use trying to break down a habit of fear by going *directly at it*. It would be just as much use to say to the ocean waves, 'Do not roll,' as to say to yourself, 'Do not fear.' The whole thing in getting rid of fear and in building up character and growing into self-mastery is to build new *habit systems*, which make fear impossible."

"Now, how do you go about that?" I asked. "That is a big problem. We are not all psychologists as you are."

"Well, there are numerous good ways. But here is an example of one good way. Here was a young man who was afraid of being up on heights."

"Humph, that fits me," I remarked. "It has only

come on me in recent years. I used to be the champion high diver as a boy and had a perfect passion for climbing to high places. But in recent years I get paralyzed if I get up on a high cliff or building."

"Well, we will probe into that some time," the doctor replied. "It began somewhere you can be sure, because it isn't natural. Keep always in mind that there are only two natural fears. Now this man was afraid of going up even to the second story, and he was terrified by the third or fourth story. He simply had to be on the ground floor and know there was a level space all around him. It made life unbearable to him. He could not bring himself to go up in an elevator. You can imagine how impossible for a young man to find here in New York a job where he would never have to leave the level ground.

"This young man was twenty-four years old and had been a rather sensitive child. We went through all of the usual procedures and finally I was able to discover *three very definite situations* which, I think, were undoubtedly responsible for the whole thing. One of these, which the young man related in the story of his childhood, was a jovial old uncle who, as he recalled, used to catch him and hold him dangling over an open well, threatening to drop him in, while the poor little fellow wriggled and screamed with terror and caught his breath. He would be just about exhausted when his uncle felt his jovial proclivities satisfied. He did not know he was ruining a boy's whole life. That was the first thing.

"The second thing came shortly after he started to school. A teacher, who learned of his fear of high places, in order to discipline him, used to threaten to drop him out of the second-story window when he disobeyed. Then, the third thing in this beautiful idea of child training was when his super-wise and intel-

ligent father did exactly what he should not have done. He dragged him to the edge of high buildings and ravines and said, 'I'll break you of this fear.' Oh; if parents would only get over this fool idea of 'breaking children's wills' and 'breaking children's fears.' They break the child instead and often break them for life. This father, for instance, in forcing this terrified child to the edge of high places only set the fear more firmly every time. Nobody understood the child enough to remedy the situation. The other children made him worse by calling him "scared cat" and such things when he would not climb trees and buildings. That kept up into young manhood until finally he found he couldn't get a job of the kind he wanted because he had to go up constantly into high buildings; so he voluntarily came to me.

"It was a long process of reeducation. I had to bring these old situations out and show him clearly how they were responsible for developing his habit of fear. Then it was a question of gradually building up confidence—confidence that he could overcome it. I had to set definite tasks for him to try. I mapped out a program like this: 'You will go so many times to-day to the second story of a building and so many times to-morrow. You must summon all the confidence possible and remember *there is no reality to your fears*. If there were, everybody else would be afraid.' Then I gradually increased it from one story to two, to three and so on, as his feeling of confidence developed. Now, that is exactly the thing his father might have done. But as parents so often do, he began at the wrong end. He began by taking him to the top of the building first and made him worse. I began at the bottom of the building and gradually cured him. And I let him do it voluntarily and encouraged him, until now he goes up and down in all

these New York sky-scrapers without any thought of being afraid.

“And right here, I want to say another word about breaking children’s wills and the like. I want to express my opinion as strongly as I can. It is perfectly damnable. It ought to be made a criminal offense. I have seen more damage done to children through that notion—the notion of sparing the rod and spoiling the child and all that—than I have seen through children being physically maimed. Frightening, threatening, ridiculing children, making them feel inferior and inadequate, not so good as others, and thus destroying their healthy confidence in themselves leaves deeper scars, and handicaps them more than breaking a leg or an arm, or even amputating a leg or putting out an eye. I would far rather you would maim and physically injure a child of mine than to frighten it or destroy its healthy self-confidence. I have personally known in my practise many, many people who have failed all through life even to *try* half of the things they could have done easily and well just because this hellish method of education had made them *afraid they could not handle the job.*”

CHAPTER VIII

WHAT ARE YOU AFRAID OF? (*Continued*)

How to Compare Yourself with the People You Fear

VIII

"IN ORDER to overcome their fears," Doctor Mitchell continued, "as I have pointed out, people take all sorts of ways you would never expect. Sometimes they develop an over-aggressiveness, by which they try to screw up their own courage. Very often the aggressive, managerial person is taking that method to cover up his fear that he will not measure up and make good. Here, for instance is a man who is a fine illustration of that very thing. He is thirty-nine now and I first saw him seven years ago. He is a man who can make a fairly good speech, does it frequently and *seems* to meet his audience without any great difficulty. He is a person of pretty high intelligence—probably ranks in the upper one-tenth of one per cent. in ability. That means that not more than one person out of a hundred is his equal or superior mentally. Yet he came to me with a feeling that he was just no good—a fear that he was failing all around.

"I found from questioning him that he had gone first to a small public school and later to college. After leaving college he did some lecturing and tutoring, but he said that he always felt the strain of making a public appearance. He would side-step and scheme so that he would not receive invitations to speak, although it meant part of his livelihood. In school he was sometimes the head of his class and always stood well. He got through high school at fourteen—a good record, and graduated from college at twenty. In his tutoring and lecturing, however, he changed from school to school and was not much of a success.

He did not get along well with people because he was brusk, conceited and aggressive. People thought him over-bold and not afraid of anything.

"I saw at once that his aggressiveness was a form of fear and I probed into his history to get at its cause. I easily found it. He had been one of the youngest children in a family of nine. And, somehow, around the home nothing he did ever met with approval. Whatever he did he ought to have done better. They made him feel that he was not measuring up and that he could not measure up to their expectations. If he did not stand at the head of his class, they made him feel that he was poor stuff. That had been his daily discipline as a child. As far as he could remember he had never received a word of encouragement. His parents had impressed him with the feeling that he was no good.

"I can easily trace a large part of the difficulties and fears of seventy-five per cent. of all the people who ever come to me to their parents. Their sarcastic and derogatory remarks implant in the child a permanent feeling of inadequacy—inability to 'come across' as they should. With this boy the parents had kept this up all through high school; and when he was ready for college he did not want to go because he felt, 'I am not fit to go to college, and if I go I will not make good.' Indeed this fear led him to get out of going to college as long as he could, and he got a routine job in a store. Finally, the family urged that it would be a disgrace to the family—not to him—if he did not go to college. So he went, but he had no heart for it. But this had given him the habit of side-stepping when he could. He felt all the time that there were much bigger things he could do than he was doing, but he was afraid even to try them, because his parents had made him feel like many parents do,

'If I can't make good, why try at all?' Just for this reason thousands of people never try the much bigger things they could do easily and do well.

"Now, when this boy got to college with this feeling of fear and inadequacy, he determined he would not let any one see that he was afraid. And to do this he did not know any better way than to make a big pretense of bravery. So in order to compensate for his fear he developed an over-aggressiveness. He was trying to bolster up his courage. He never met his classmates on a friendly basis. He always had this nagging suspicion that they would judge him adversely, so he would convince them, right off the bat, that he was the right sort. As a consequence he went around with a chip on his shoulder. You take these chip-on-the-shoulder people and nearly always they are trying to hide their own fear that they can't 'stand the gaff'—can't make good.

"And my, my, how a little thing like that may affect your whole life—its success and happiness! This man, when he got a job teaching, was over-aggressive in the school-room and in the community. He was in constant trouble with his board, his pupils and the people. He thought he must be aggressive in order to show he could rule and discipline his classes. He was uncertain of himself; and uncertainty of yourself is fatal to success in either classroom management or management of people. People, even children, feel it although they may not name it. A foreman or executive who is uncertain of himself often tries to cover up his fear of himself by being over-dictatorial, and he invariably rouses the very antagonism that he fears. When a man says to his men, 'I wish, boys, we could get through this job to-day,' which is the way a person fairly confident of himself usually talks, he gets results. His men see that he seeks cooperation. That

spirit makes the real leader. This other sort of man, afraid of himself, can't do it. He has to order and command, and with him it's, 'Damn you, get busy there!' You often see just that kind of foreman in factories and on construction work. They are in hot water all the time. Of course some driving foremen are not trying to cover up their fears of themselves; they are just built that way. And the men sense the difference and take it all right from a man who swears at them easily and naturally—indeed, you might say, gracefully. They feel the difference. One man they call a mean, dirty scoundrel. The other man they say is a 'bully good fellow,' a 'good scout' and all that. It is a strange thing, but men do not mind being sworn at and ordered around in the right way by the right man. They actually feel a sense of safety that 'the old man' knows what he is about.

"But, the fearsome type who are over-aggressive are always in hot water. And this man was that type, and he finally came to me in all sorts of discouragement and trouble. He got so much open resentment that at about thirty-two years of age, when he came to me, he began to realize something was wrong with *him*. It took me a long time to show him what he was doing, how it had arisen and above all to convince him that he *had about three or four times the ability to succeed and do big, satisfying things that he thought he had*. I must say it is quite a stunt to get a man to appreciate his real worth, his real abilities and the worth of his own performances. I often think of it as *re-creating your lost enthusiasms*. That is one of my big jobs, re-creating people's faith in themselves. I should like to talk to you sometime a whole evening about that.

"Suffice it to say that I long ago got this man's self-confidence back and got him well adjusted so that

he has been making good and living a vastly happier life. I think I can show you better how I go at such cases by taking the story of another man whom I have had for some time. I have a real scheme for building up self-confidence. I have persons make a list of a large number of possible every-day human performances.* I usually make them list at least twenty or thirty tasks. Nothing extraordinary about it; you see they are just common every-day performances. But you will notice also that all of them are *typical of the performances of people who are a success at these things*. You see, my idea is to get them to place clearly before themselves the human performances and jobs which people ought to be able, indeed, are able to do, and if they do them well, they are what we call successful people.

"When they make this list I make them go through it, taking one at a time and comparing themselves and their performances carefully with it. I have a regular score that is very simple and easy and runs from one to five.

"Then I explain that if they feel they are in the best ten per cent. on any particular performance they are to rate themselves five; if they feel they are not quite so good as the upper ten per cent. but still are better than the worst seventy per cent. they rate themselves four; if they are poor but feel they are not quite so poor as the worst ten per cent., and yet, not so good as the best seventy per cent. they rate themselves two; if they are about fifty-fifty they rate themselves three. You see, that gives a wide range of choice and yet it gives them a pretty accurate idea of where they stand in their own estimation on any performance. It gives a range

*For a chart for rating your abilities at every-day tasks see end of the interview.

of the upper and lower ten per cent. to the best and the worst, a range of the next twenty per cent. at the upper and lower end of the scale to the second bests or second worsts, and a wide range for the average performers.

"You would be surprised what a new idea of themselves this procedure often brings to people; and I shall show you in a moment why it is such a startling revelation. Take, for example, this man I spoke of and take the performance of building a stairway. Remember he was a man who came to me in fear, convinced he was no good. He said, 'I guess I can do that pretty well. I have done a little wood-work. I could do that about as well as the average person, so I'll rate myself three.'

"Take next the matter of playing the piano. He said, 'I will have to rate myself one on that. I can't play to amount to anything on the piano.'

"He next came to 'driving a car' and said, 'I have been driving a car a long time; never had any trouble, no accidents or anything; I'll rate myself five on that, I know I'm in the best ten per cent. there.'

"You see, I am setting a self-confidence trap for them in which I know I shall soon catch them before they are aware of it. They never suspect what I am doing, until I catch them in their own net. When this man, for instance, had finished the entire list I made him add up his total score, which ranges from one to five on all these separate items, and had him strike an average. If, for example, the total number of performances in the list is twenty and the total sum of all your ratings is sixty, then your final standing would be twenty divided into sixty, or three. If your rating sums up to eighty, your score is four.

"Now when he had done all this, I had him take a number of his acquaintances, perhaps eight or ten and

carry them through the same procedure, rating them as carefully as he did himself. Then I checked up and showed him the score he had made of himself and the score he had made of other people. He was astonished and greatly encouraged to find that he had rated himself higher than any one else. As a matter of fact, they nearly always rate themselves as abler than the persons with whom they compare themselves. This is perfectly proper and what I want them to do. Sometimes I require them to rate themselves in this manner with two or three other persons every day for a week. And when I check up the grand averages they nearly always stand the best of the lot. Take this man, for instance, who compared himself with a lot of people on over *thirty* different performances. I said to him, 'Your score is one hundred eighty-nine. No other person in this group, including most of the people you know, score as high as that.' I could go through my files and find scores of people who had gone through this rating scheme and, almost invariably, they come out with a higher standing in their own judgment than *the very people whom they have been afraid of*, the very people with whom they have, perhaps, been comparing themselves unfavorably for thirty or forty years. Think of the absurdity of all these years of fear! It gives them a new light on themselves. For getting over fear, it is the best method I know.

"And, don't you see what I have been doing? It is this. When they have been judging themselves unfavorably and saying, 'Oh, I don't amount to much, I can't make good,' and all that, they have been applying a *blanket judgment to themselves*. But, at the same time they have been applying a *particular judgment*—an estimate of *particular virtues to their friends*. Now I just reverse that process by this little scheme of mine. At least, I make them apply their judgment

item by item to themselves, as they have been doing to their friends. It is this blanket judgment of being 'no good' that sets up fear in people. You remember when I was talking to you some time ago about how to get along with other people, I showed you how I get people to compare their personality traits and characteristics with others. Well, this is a method for comparing not their personality traits but their actual powers of performance and their actual achievements and abilities, with other people's.

"Right now I have a woman whom I have been putting through these paces for four or five months. And, just as many other people do, she is fighting the inevitable conclusion. She is banking so hard on her fears and on her belief in her inefficiency that she dare not face the proof of her real efficiency for fear she will have to make good on it. She actually fears she will not make good with the very abilities which I am proving to her that she possesses! It seems unbelievable, but people often fight against my proving that they have large unused abilities for fear they can't make good on them. It reminds me of an incident one of my colleagues had happen in his work. He had a man who had walked for years with a crutch, but one day my colleague set a situation so the fellow got excited and ran nearly two blocks without his crutch; and then, when he discovered he didn't have his crutch, he yelled for them to bring it to him quick, as he couldn't walk without it! It is surprising the way people get muddled about themselves, isn't it? And, we do have to be so kind and sympathetic in order to help them.

"For instance, this woman will say, when her list of performances proves her superiority, 'Well, Doctor, these performances are not important.' 'Well,' I say, 'let us get some that are important,' and I go through a long list of all sorts of human performances and have

her pick out the ones she thinks important. I then have her take six or eight and rate herself on them. I dropped this exercise with her for the last week or two because I found her resistance response was becoming a habit, and she was rating herself too low for fear she would have to make good on it if she rated herself as high as she really should. I shall soon come back to it again, when I feel that she has become a little more open-minded. But the great thing with her is that she is *resisting discovering her abilities* for fear she will have to make good on them. I make her list the performances her employers *expect* of her and while she will in time give herself a high rating on them, yet she can not now separate her blanket judgment of her inefficiency and fear from her really high ability as proved by all these carefully worked out particular ratings.

“You may wonder why people usually rate themselves higher than others on this scheme. Well, that is one of the tricks up my sleeve and is due to the fact that people list more of the things at which they are good than they do things at which they are poor. It is this natural tendency I count on, because I know it is going to give them a high rating and a lot of self-confidence. For example, I would never put in a list for myself tasks such as ‘singing a solo’ and ‘playing the piano.’ But when they have listed the things they can do and compare that with the *same performances* in other people they nearly always find they are higher. This is because they list mostly performances at which they are fairly good. And yet, I have had people insisting they could not do a certain job when in the same breath they rated themselves higher than ninety-eight per cent. of the people engaged in that sort of work!

“Here, for instance, is a woman, twenty-eight, a

college graduate and teacher in the high school. She wants to gain mental and emotional control and fears she will not make good. Yet take her list. Look at this one, 'Teaching English,' she has marked herself four. That means she believes she can teach English better than seventy-five per cent. of the people who do teach English. She says she 'can teach mathematics better than ninety per cent.,' 'can play a piano better than twenty-five per cent.,' 'can sew better than ninety per cent.' and so on. Yet she comes to me because she says she has no confidence in herself, while at the same time she stands in the upper twenty-five per cent. according to her own judgment! Can you beat it? They are actually scared when they come to set these things down and take a square look at their own abilities. I make them look themselves in the face—for most of them the first time they have ever done this in their lives. I think as a rule their judgments on these individual performances are pretty just. But you see it is this *mass* feeling, this *general* attitude which has become so set in their minds and habits by long experience that they carry over regardless of the fact that they have done their jobs well.

"Here is a man who illustrates that. He is a man, I may say, of poor ability to start with. From 1918 to the present time he has had ten different jobs—the same kind of work each time. But here is how long he stayed in each situation; look at his own record, 'two months,' 'one month,' 'two months,' 'twenty-three months,' 'twenty-eight months,' etc.,—the last, the longest he has ever been in one place. He says also, 'Something keeps me away from success. I am very much dissatisfied with my present work, and I worry.'

"Now, let us see what he says he can do well. 'Better than ninety-five per cent. of watchmakers.' Watch-making and repairing is his job. 'Better than

seventy-five per cent. of engravers,' 'better than fifty per cent. of typists' and so on. He is fearful of his ability, yet he is better than nine out of every ten of the workmen at his own work! Why should a man be afraid of failure in his job when he is better than ninety per cent. of the people in that job?

"Why, the answer is that it is just this mass, blanket judgment. I show this man that when he comes down to a careful particular rating he is among the very best men in his own line of work and ought to be entirely confident of success. *I have taught him to make that his chief consideration.* Of course, I have to guard against some persons over-rating their abilities. I don't want to lead a man to think he can do things he can't do. I think this man, for instance, is rating his ability as a watchmaker a little too high. Nevertheless, when he says he is afraid I show him how it is mainly this old general blanket feeling he has, and does not in any possible way apply to his success in his job because that is absolutely assured. It has helped this man immensely just to rate himself against a lot of other people, by a definite rating scheme.

"If you give sensible people a good plan such as this simple method of mine presents and they see the situation clearly and revamp their own judgments of themselves, then, in many cases their fears disappear so completely they can't tell why they have ever been worried. For a good many, however, it takes some time; they have to come back for months and repeat the dose, again and again, with my help, and compare themselves with people with whom they are in competition. And practically always when they do so they find they rate themselves higher than their own competitors—the very people they are afraid of. They are afraid because they are carrying over a general judgment and applying it to specific performances.

“Summing up then, I think we can now see that there are two chief causes of fear: First, the parents frighten, threaten and ridicule children and make them feel they are no good and can’t make good, and this blanket fear carries over all through life; and second, the school sets tasks that are utterly impossible for at least fifty per cent. of them ever to perform, and they thus develop the great fear of life—the fear of failure. I have often told you, Wiggam, you remember, that I think the aim of education should be not so much to give you special skills, as it is to give you an adequate appreciation of your abilities and a just understanding of your limitations. There is never the slightest discouragement about this. Indeed, it is, to my mind, the one and only way to prevent an enormous amount of failure and discouragement.

“For instance, thousands of boys are sent to college every year by over-ambitious parents who think, ‘Oh, my boy must have a college education.’ Thousands of these boys fail and come home discouraged. The discouragement may last through life. It is usually not a lack of a lot of ability on the boy’s part. It is lack of the ability on the college’s part to provide for every sort of a boy. The present-day college is not fitted for more than about ten or twelve per cent. of American boys. But all boys should have an education that fits the boy instead of parents and college faculties trying to fit the boy to the college. The prime point is that by the time a boy is eighteen, our schools should provide him with a sufficiently just idea of his abilities and an equally sound, healthy understanding of his shortcomings, so that, if he has not this special kind of ability and temperament, he would never make the mistake of starting to college to secure rather limited academic training. And the parents ought to understand all this, too.

“Why, I get failures here in my office right along from the very fact that people do not know the things which they can’t do and thus rush into impossibilities. They are going to fail in those undertakings, not because they do not have a good deal of ability, perhaps, but they can not do these particular things or else can only do them with immense strain. It is wise to take stock of your equipment, to learn your weak points as well as your strong ones. *Go into the thing in which your natural equipment will count for the most*; and if you do not know what your shortcomings are you will likely not know enough to avoid undertaking at times the impossible.

“My own case is a good illustration of this. I wasted a lot of time and effort and pretty nearly ruined my throat trying to learn to sing. I failed completely. And it might easily have happened that I should have carried that failure over into other things, got that blanket notion that I was no good and developed a first-class case of fear and failure all my life.

“Here is another example, that of a man with whom I have been dealing for the last two years. I have been especially working on that one point with him because he does not know his limitations and is trying the utterly impossible. He is about thirty-two, and he has the idea that he can become a great writer. He has about as much chance of becoming a writer as I have of becoming a grand opera star. This man has good ability, although tests show he is not a top-notch. He stands in the top seven or eight per cent. of the American people. He thinks he has unusual ability at descriptive writing, and he has just enough ability at this that he has been able to get started at *twelve different jobs* in writing. But from every one of them he has been fired.

“And yet, of course, he thinks it is the other fellow’s

fault, and he has been coming to me off and on for two years to see if he could not write a book. He sent me a lot of the manuscript and I said to myself as I read it, 'What *can* be the matter with the man?' I took one of his stories and submitted it to a manuscript broker and he read it and wrote on it, 'Utterly useless.' I could pick out in any high school at least one-fourth of the pupils who could do as good a job.

"Now, I have had to take that man and try to re-adjust his whole idea of himself, and try to get him started at something where his really excellent natural equipment for *other things* will enable him to make good. He is not making good because he will not see his limitations and get a just idea of his truly fine abilities.

"You may say that is hardly a case of fear but of over-confidence. Yes, but the over-confidence is to try to compensate for his fear of inadequacy. He is a person whose father and teacher both thoroughly convinced him in childhood that he was poor stuff. You see, it is foolish parents again! May the Lord have mercy on their souls for a psychologist can't have much. He went to a special school right near my house here for a while, where one of the teachers made him feel that he was just about the poorest and most worthless boy that ever lived. His record, under these circumstances, of course was not good. He told me he came close to making membership in the honor fraternity known as Phi Beta Kappa, but I got his records confidentially and found there was only one subject in which he came within reaching distance of Phi Beta Kappa. In all others he came near the failure mark.

"Now, don't you see that he is trying to bluff himself into the belief that he is really an extremely able person who is being treated unjustly and that his abilities are not being recognized? He is trying to compensate

for that early established feeling of inadequacy by saying to himself, 'It is some one else's fault; I am really a very wonderful person and I shall prove it by writing a book that will astonish every one.' That same thing is true of many people who try to become writers when they have no more talent for writing than they have for prize-fighting. They do not want to write because they have something deep and urgent to say, but because they think a writer is an important person and they picture themselves as writing a 'best seller' and being talked about.

"However, I think in many such cases, perhaps a majority, there is another factor, a factor of constitutional make-up. And when I say 'constitutional make-up,' I do not mean that they are in the grip of some inborn tendency that they can not alter or overcome. I mean simply that there are for all of us some directions in which we develop and react more easily and readily than in other directions.

"And, when it comes to their natural tendencies, I, personally, divide people into three classes. I have tried it out here in my practise and find it works.

"First, those people, who, when they find they can't do a thing, develop an antagonistic attitude toward other people. They get up the notion that the reason they have failed is not their own inability, but the fault of somebody else; they are being put upon, not given a fair chance, somebody has it in for them and all that. Now this was exactly the case with this young man. He thought the magazines and editors had it in for him and would not accept his material even if it had high merit, as he insisted it had. He would not admit it was his fault and that he had no talent. But that is going to be my job with him—convincing him that he must recognize his limitations in that direction, just as I had to recognize that I could never become a

soloist. It does not bother me to recognize that I am not so able a man as Theodore Roosevelt was. I must recognize that I have enough intelligence and character to do some job well, find what that is and do it; and, to my mind, that ought to, indeed it *must*, satisfy a man. But these people will not admit their limitations; they try impossible stunts and are always in trouble and feel fear and meet failure and never do one-half of the things they could.

“Second, is that group of people who, when they find they can’t do a thing, say to themselves, candidly, ‘Well, I have bit off more than I can chew. I have done my best, let’s call it a day’s work and quit.’ They promptly forget all about it, go off in a healthy-minded attitude and tackle something new where they have a better chance to succeed. I never have any trouble with these people. They are the salt of the earth.

“Third, are those people who, when they find they can’t do a thing, develop all sorts of substitute reasons why they can’t. They will not admit they can not do it. Oh, no, that is not the reason; it is because they are not well, or have some physical ailment or something. The ailments and excuses they develop are legion. They have pains in their arms, for which the physician can not find any cause; they develop ‘heart-failure,’ fake headaches, digestive troubles and all that. Of course in some cases it goes to the point of using crutches, developing what is known as ‘hysteria paralysis’ and all that. Such advanced cases fall into other hands than mine. My people of that sort merely develop headaches, stomach trouble and similar excuses.”

“Do you mean to say they really have a headache?” I inquired.

“For the time being, they think they have. You would be surprised how easily you can convince your-

self that you have all sorts of abnormal feelings. People who have real headaches usually belong to the second group,—those who grit their teeth and go through it anyhow. But if you don't want to do a job you can easily find reasons why you should not do it. Perhaps you say to yourself, 'My, I was out late last night, I ought not overdo, I'll be sick if I do—indeed, I don't feel very well—not well enough to do that job as it should be done. I'd better do it when I feel equal to it.' Of course if we just have to do the job, we realize this and jam it through, no matter how we feel.

"But these substitute people go much further. They carry it to the point of developing a *permanent, general feeling of fear and inadequacy*. I have just such a case now—a marked example. It has ruined his life. He is an Englishman who came to this country when he was thirty-seven. As a boy, he had started work around a big mansion and, by the age of twenty-seven, had worked his way up to head butler; this was a most responsible position, where he had to expend wisely over fifty thousand dollars a year.

"However, he left this fine position, giving as his reason that he had a better opening elsewhere—one which he admitted paid less money, but he liked it because of its promising future. Here he was soon chief man again with big responsibilities. Between the time when he had risen to be head man at twenty-seven and the time of his coming to America at thirty-seven, he had left six different places where he had had responsible positions, every time, as he said, to take a 'better opening.'

"He got a job here in a big Fifth Avenue home and was soon head man there. Again in a short time he quit this to get what he said was a 'better job.' Then he took a job in a big down-town hotel and was soon head waiter—a very responsible position; but he left

that. Here, however, other explanations began to crop up as 'reasons' for his changing jobs. This last place he had to quit because, as he said, 'I was not feeling very well. It was such a strain, I got stomach trouble.' Had he held one position all these years and then put up the excuse of 'stomach trouble' I would have believed him.

"Next he got a job as ordinary waiter in a smaller hotel, but his stomach trouble did not improve; and at this stage he told me that he began to have bad headaches and began to lie awake at nights. From his head going wrong the next thing his feet went back on him, so he got a job as a room waiter, not so good a place, but one where he did not have to stand on his feet so much.

"So when he came to me, his headaches were bad, his feet were bad, his digestion was bad, nearly everything was bad. You would have thought him about ready to die. Yet I had him carefully examined by a physician, and he pronounced him physically as sound as a dollar.

"Now, the simple explanation is that that man was afraid he would not make good, even when he was actually making good. He got the fear he couldn't hold out at it. It seemed evident that the development of his present sense of inadequacy had been a long slow process. He came to me, out of a job, utterly discouraged.

"Well, I took him through the usual process of comparison, demonstrated to him his own abilities, and pointed out how he was deceiving himself. He got a job again as waiter at a fair income, one that would comfortably support him. He is now on the up grade right along, his physical symptoms have practically all disappeared, and, while he may never come back completely, yet he is a thoroughly happy man and satisfied in doing his work efficiently. When he came to me he was plainly headed for an utterly helpless middle and

old age; but all I can say now is that he is happy and well, and on the road up instead of on the road down."

"Don't you get a great many people," I asked, "who develop a chronic fear of old age and poverty?"

"Yes, I get a good many; perhaps ten per cent. of the old people who come to me have that fear, some pretty badly. The fear of poverty is just an offshoot of this general fear of failure—the fear of a person that he will not make good in his old age. But it is usually because he has been taught fear of failure and to side-step the direct issues of life from his youth up.

"Such people need encouragement, of course. Very often, just talking the situation out with me gives them a new view of it. I first try to show them that there are two things in this world we must recognize: First there *are things we can change*; and second, there are *things we can not change*. Now you can not change the fact that you will grow old, but you can change the way you look at it.

"In order to change your attitude toward old age, you must first take stock of your income and working capacity. Then I would have you list what you think are your minimum requirements to live on, from day to day. You nearly always find this much less than you had been calculating. In most cases these people find that if they handle their resources, however slender, with wisdom they will have enough to meet these bare necessities. When you go over the situation, item by item, you find again that their fear is just a sort of vague blanket feeling that they may have to be dependent. They have never before figured it out and faced it squarely in detail.

"After we get the situation in detail clearly, I go over it with them several times on different occasions, each time showing them their minimum requirements for food and shelter and comparing that with their

earning capacity. I have to do this for quite a while, ever so often, until it builds itself into their system of thinking and they forget about their general *blanket fear* and lose much of their concern. Of course, when they contend they must live in certain surroundings and style, I point out that still that is not an absolute necessity. They *can* be comfortable and happy with good food and shelter and independence and nothing else; these, they usually see they can be sure to have by wise management, and then their fear just disappears even in very old people whom I have had."

"Do you not also," I said, "find a good many people afflicted with fear of some disease that they do not now have?"

"I have a number of people of that kind. The fear of insanity is perhaps the most common. I have for a long time been taking a census of various fears of *normal* people, that is, how many have this fear and how many have that; I shall soon have something to publish on that. But I find that about two normal people out of every one hundred are afraid they will go insane. That means that at least two people out of every hundred who read this article have a fear that they are likely to go insane. That is pretty serious when we reflect that nearly all of it is needless. There are some other cases where there has been some member of the family who has gone insane; and in a few cases they have read about some person or know some one who went insane under circumstances somewhat similar to the ones they are now in.

"Of course where there has been much insanity in the family, I prefer that such cases be handled by psychiatrists, neurologists and others where they have more facilities for treatment than I have. If I find some close relative has gone insane from disease, such as syphilis, which is a fairly common form of insanity,

I point out that that is *not hereditary*, although there is a strong popular belief that it is. If this is their only cause for fearing insanity, this new knowledge that it can not affect them clears up their fears at once.

“In those cases, however, where they fear insanity because they have read or know of some one having gone insane under circumstances similar to their own, I make them go into a careful analysis of this person’s life and situation. Then I ask them this question, ‘How many of your friends or acquaintances have gone insane or how many do you think are likely to go insane?’ Of course they can name very few if any. Then I put my next question, ‘If so very few persons ever go insane at all, then why should your case be like that of this particular person whom you have known to go insane?’ They can not find any good answer to this. Then I go a little further and say, ‘What are the conditions in this particular family where this insane person is?’ Next we analyze the differences between the two families and have little difficulty in discovering that, while they had a blanket judgment of great similarity, yet the two families are decidedly different in many significant ways.

“Where the queer or insane person is a relative, I still show them the significant differences between the two families. If the relative is in their own family—a brother, sister, father or mother—then I show them that, while the possibility does exist, yet it is really quite remote, because we have numerous persons who go insane where no other member of their families has ever followed suit. I also show them that by rational living and self-mastery they can largely control their own lives and fears and their nervous habits. Finally I show them that if we granted that they were *sure* to go insane, which they are not, even then, worrying about it would not help but only exaggerate and

hasten it. 'Why not take steps,' I say, 'which will tend to ward it off? Why not develop a strong interest in outdoor life or some objective outside-of-yourself sort of life? These often ward off insanity completely. Why not develop a schedule that will keep you optimistic?' And I work out with them an hour-to-hour schedule, sometimes even a quarter-hour schedule, of interests and duties, which does not give them time to think about their troubles.

"I confess that these cases are mostly women. The proportion to men is at least five to one. Here, for instance, is a woman who feared that she was headed straight for the insane asylum. She was calling her husband home from his work as many as four and five times a week to look after her. She could not stand it without him. I saw her first five years ago. I have not seen her now for more than ten months. I hear from her occasionally as to how she is getting along. I made an analysis with her of her whole life's story. The only symptoms that she had were her own ideas. She was afraid she was going to kill herself, and she would call her husband home to keep her from suicide. That was her chief manifestation. I do not believe she ever would have committed suicide, but the fear was there. She got so she was afraid to go near the kitchen; she would lie in bed in the morning with some excuse, so she would not have to get her husband's breakfast, because she was afraid that the sight of the knives in the kitchen would bring about this thing that she dreaded.

"Now, I found it all went back to three or four things that had happened in her life. When she was about eight years old there was a distant relative, a man, visiting them, and one day when her mother was out of the house he took her to his room and frightened her dreadfully, although he did not actually mistreat her. Then he bluffed her into not telling any one, and

she went about, like that other woman I told you of, with the feeling that there was something shameful she was concealing. This grew on her the more she tried to conceal it, and magnified itself out of all proportion to its real significance.

"The second circumstance was that her father was rarely sober and would pawn the clothes and shoes of the children. As a result she had to go to school poorly clad and wearing cast-offs, and the jeers of her companions made her feel inferior and afraid.

"When she was a young woman, she went out nursing and the husband of one of her patients endeavored to embrace her. This left her with the feeling that there must be something the matter with her or else no one would feel free to insult her in such a manner. She got to thinking that this was just a part of her lowly situation and felt degraded. She did not lay this last circumstance to the man's aggressiveness, but thought the fault must lie with her—that there must be something about her that encouraged such action. She was then in the early twenties.

"These three things had magnified themselves in her life, until she felt she was worthless, and might as well be dead. I do not believe she would have killed herself, yet she thought this was the only way out."

"Did she ever tell her husband of these experiences?" I inquired.

"No, these particular occurrences had almost passed out of her mind. But they had started this *general* feeling of worthlessness, and the feeling that she was 'no good' and inferior had carried over. She had forgotten how they began. She had real difficulty in recalling the actual experiences, they had gone into her past so completely. But I took the responsibility of telling her husband in order to get his cooperation. And he has been perfectly splendid about it.

“To show how these experiences had disappeared from her ordinary thinking, I well remember the startled expression on her face, when, during my questioning, she first thought of the occurrence in her childhood. She was not going to tell me, but I showed her, as I do all these people, that if *it is something they would be ashamed of* that that is probably the *one* thing, which, without ever being in their conscious thinking, has, nevertheless, colored their whole lives. So I finally got at these really trivial circumstances, which had passed over into a general feeling, ‘I am unworthy to live. I must call my husband or I will take my life.’ And when he came she was soon quiet again. Between us, we built up a schedule that has made her a new and a very happy, healthy-minded woman.

“It is truly amazing the number of fears that grow out of the effort to give substitute reasons for not doing things; in time they grow into real reasons and profound life-long fears. Here is a beautiful case—a woman who is afraid of the sun. Imagine it!

“She is afraid to walk away from the house. She has also what one might call fear of open space, agoraphobia. The only time she seemed to be content was in a closed room, with closed doors, and with closed windows. She was afraid of automobiles two blocks away when she heard the sound of their horns.

“I found she had been a weak youngster to start with. She was thirty-eight when I saw her. I think that having been a weak child may have had something to do with it. In early childhood, she had been for nearly two years on the verge of death; and it had been with the greatest difficulty that she was brought through. But other even more important things had happened. Her mother was a very severe disciplinarian, and she had made that child work, scrub floors,

wash dishes, when apparently the child was just about 'all in.' That kept up until she was nearly sixteen when she felt she could stand it no longer and must do something.

"Now what did she do? She developed substitute excuses. This urge became the dominant thing in her life. She could not operate directly against her mother—she could not say to her mother, 'I won't do it. I am going out and have a good time like the rest of the girls.' She didn't have the courage and was not strong enough for that. So she began to play sick,— 'something was the matter,—she couldn't do it.' From one thing she went to another. When this thing had been going on for twenty-two years there was hardly a thing in life that she was not afraid of. There was not one real fear in the sense that there was anything that ever happened to her to make her afraid of that particular thing; she had never been injured by an automobile, never had had a sun-stroke.

"The only thing was this continuous hard discipline of her mother and then her attempt to find a way of escaping it. And she did this, not by telling her mother that she wouldn't do it, but by telling her how terribly *afraid* she was to go out in the field, out in the garden, or out in the street when she had to do something. And it worked. Playing the fear game was a better policy with her than defiance, and she put it over on her mother. There was just enough in the make-up of the mother—she was a little afraid of the supernatural herself—for the scheme to work. She was a little bit concerned that maybe there was something the matter with the child, and she was willing to humor her a little. And the moment she did this it opened the gate for the daughter to develop all kinds of things.

"When I first saw that woman she was staying in

a room about twelve by fifteen and she rarely moved out because she was afraid of *everything*. The first time I got her out of that room I got her one block away from the house, not out of sight of the door even, and I could not get her any farther. She had to go right back. About a week later I got her around the block, and I did it by almost actual force. I took her by the arm firmly and said, '*You are going around this block;*' and finally she gave up and went.

"Well, it was five years ago I started with her, and she is now forty-three years old, I think. For nearly three years she has been running a business of her own, and making a living at it. Up to that time her mother and father had been supporting her in this frightful condition of fear. Think of the misery of the years that woman went through! But she is now running her business, and goes on without any special fears. She goes out to the movies with her friends, talks with the neighbors and goes out for rides. But, I will never forget that day I took her by the arm and said, *You are going around this block.*' For a time she pretended to be very angry with me. Going so far from her closed room was too much for her. But she went; and now she would, I think, quite readily go around the world. And all due to applying common sense and sound, non-mystical psychology!"

CHAPTER IX

WHAT ARE YOU AFRAID OF? (*Concluded*)

How You Form Fear Habits

IX

“THERE is one question I have been waiting to ask you,” I remarked, “and that is, does fear ever cause stammering?”

“Oh, yes, fear is often one of the chief factors in bringing on stammering. Of course some children and some families, set up stammering more readily than others. But all can overcome it. I have not had a case now for seven or eight years past. I did a lot of work on stammering ten or twelve years ago, but there are now two or three fine specialists in New York and others elsewhere who do that work; also, the public schools have speech-defect classes under trained teachers, so I seldom take such persons any more.

“Nearly all children stammer at some time and if at that time they get frightened or are ridiculed, it may easily become a permanent habit. I started to tell a story one time and began stuttering and a woman who was visiting said, firmly, ‘Now, son, you begin that story over again and tell it straight.’ And I have never stuttered since. Had she ridiculed me at that moment, I might easily have developed great speech difficulty.

“Indeed, it is terrible to ridicule a child. I think it is responsible for many so-called special disabilities. Many persons who have good general intelligence, often say, ‘Oh, I just never could get mathematics,’ or some other study. I think when people of good intelligence say that, the cause is usually something like the following: I had a little girl seven years old who could not do her arithmetic work.

Fortunately, we caught that case early. She was brought to me for treatment, about the first term of the second grade. The teacher simply could not do a thing with her in number work, although she was all right in reading, writing, spelling, etc.

"Again, what was the cause? This time a foolish teacher. The story was this: Shortly after the beginning of the second term, the regular teacher of this little girl became ill. A substitute teacher came in and the child soon made some trivial error in her number work—a rather glaring and foolish error—and this new teacher ridiculed her before the other pupils for her mistake. That set up a fear of being ridiculed if she should make another mistake; so that, instead of the pathway of her number work being made clear as usual, this fear of ridicule blocked the pathway. It set up what we may call an inhibition—a holding back of the response. And it was only a short time until the youngster never got anything right. And she was entirely gone in her number work by the time the regular teacher returned.

"Had it not been for some psychological help at this time, this child would likely have gone through life, unable to be a bookkeeper, or a school-teacher unless perhaps in some subject such as history or English, or unable to be a cashier and, indeed, would have been shut off from many occupations and been ridiculed all her life for being 'poor at figures.' Very many bad spellers are due to the same cause—the ridicule which has been heaped upon them as children for spelling words wrong or absurdly. It blocks up that particular group of habit systems. I am convinced that many people have fine latent abilities that they do not suspect which have been submerged by this or some similar blocking up of the pathways to expression. *Fear shuts up our pathways of expression*, and, no doubt,

all of us have some abilities that are never expressed just for that reason. Fear is the supreme curse of the world, and can be the most easily and surely removed.

“The reason I say that so emphatically is that modern psychology, I think, has shown us that what we speak of as the ‘mind’ is just a great group of habit systems or habit responses. For instance, you have no mind except mental activity. It is mental action that makes mind—it is this that gives you a mind at all. A mind at rest is inconceivable. It is the action that makes the mind. If you could reduce yourself to a state of not thinking, why, for the time being you simply would not have any mind. The moment you get up steam again and begin thinking then you do have a mind. As a matter of fact, you are always doing some thinking—you always have some mind. No danger of losing your mind completely, although if you get lazy and withdraw yourself from social and mental activity it may become a pretty useless member.

“I wish you could have been in my classes out at Rutgers College recently, for I talked to those young ladies for three days about habit systems and habit responses and showed them, as I believe, that these constitute our entire mind. We talked about imagination and attention and about reason and memory; but I was able to show them, I think, that all these are merely habit responses.

“You think of your imagination or reason or memory perhaps as some definite thing, maybe something you were born with and which you have somewhat improved by experience. But in my way of looking at it, it was your experience which absolutely *created* these things. They did not exist until you had experiences. Of course some people are born with capacities for developing a larger number of habit responses than others.

“Let us look a bit more closely and see how that works out. You have, for instance, a brain and nervous mechanism, and you perhaps think of yourself as the mechanic. But, it is probable that the mechanism and the mechanic are very much one and the same. We will not argue that in detail here, for it is a very technical problem. Anyhow, this mechanism by its very nature is capable of responding if stimulated. It is likely that it has at birth a few inborn specific responses called ‘*instincts*’—certainly, at least, some very easily developed responses which we may term ‘reflexes’ such as digestion, etc. But beyond these, there are your muscles, hands, fingers, etc.; which at first move about on the slightest stimulus, but entirely *aimlessly*.

“Now the great object of all education is to cause these aimless movements and activities both of the nervous system and brain, and the muscles, to become definite, concrete, useful, purposive, helpful—to bring them into controlled and coordinated systems of movements, so that they will all work together in a way that will enable us to secure food, cooperate with others, protect ourselves and, in short, carry on what we may term the needful, common-sense operations of life.

“The more we do this the more completely we become educated persons and develop what we call rational behavior. Let us see how this coordinated, useful behavior begins and grows. Here, for example, we place a large letter *C* in front of a child and say, ‘Write that.’ The child has no habit system already made inside it for drawing such a peculiar figure, so it sets to work very slowly and laboriously. Here is probably what happens; the child sees the letter and hears you speak; it thus has the stimulus from both its eyes and ears. But the eyes and ears can’t draw a

letter *C*, so they pass the word over to the motor areas of the brain and say, 'This is your job, you take care of it.' But the motor area can't draw without help, so in turn it passes the word on to the muscles of the hand and arm and says, 'Get busy, this is your job.' The muscles can't 'pass the buck,' as we say, any further, so they set to work and do their best.

"The muscles have never done this job before, so they go at it pretty awkwardly: however, by passing messages back and forth to the eye and motor centers—the eye reporting to the muscles constantly how they are getting along and the motor switchboard keeping open for transmitting messages back and forth, finally the child gets a fairly good copy made of the letter *C*.

"Next you encourage the child and say, 'That is good, try it again.' If at that point, however, you laugh at the child, *you block the motor switchboard and shut off connection between the eye and muscles and have done one of the worst things imaginable.* You have set up the beginnings of fear, failure and lack of self-confidence. Right there is where it all starts. But if you encourage the child, he does try again and again; and each time the pathway from the eye and ear, through the motor switchboard, gets deeper, more marked, more open and consequently more efficient.

"Finally, there comes a time when, if the child has occasion to copy the letter *C*, he does it without seeing a letter or without any conscious effort, or as we say, 'unconsciously' or 'automatically.' As Professor James told us, this is one of the happiest sorts of life to live,—the life which has made all our ordinary duties, such as dressing, eating, writing our letters, bowing to the ladies, choosing our neckties, taking our daily exercise, etc., automatic, reduced them, as he

said, 'to the effortless custody of habit,' so that the other mental activities can be free to do other things.

"Many people never do this nor develop large groups of habit systems. Instead they spend half their time and energy in a state of hesitation, deciding matters which ought to be habitual and decide themselves. In short, for nearly everything that such people do, they have to make practically a new habit system, instead of developing a habit that will take care of the matter without any conscious attention. I know men who have to develop a new habit system every morning in deciding whether to wear a red necktie or a blue one. They are every morning almost in the same state, as the child was the first time he tried the letter *C*. And such a life can never be happy, healthy or efficient.

"Let us see, then, how these single unit habits develop into reason, imagination and judgment. We have seen how the child learns to write. Well, he learns to speak in the same way. He tries to form the words he hears, does it at first laboriously and with mistakes, but finally the habit pathway becomes improved and smoother, and he does it automatically. He goes on and develops all behavior in the same way. He feels thirst and, at first, merely wails with discomfort. Gradually the nurse and mother show him how to connect his feeling of thirst with getting a glass, turning the faucet and helping himself. But all his achievements, all the way from learning to talk or walk to playing baseball, are merely *increasing the number of his habit systems and the coordination among them*. By and by, however, he comes to a new experience, and that is where what we call 'thinking' and 'abstract reasoning' and 'imagination' begin.

"For example, the child sees that some things are larger than others. 'This ball is large,' he says to

himself, 'this ball is small.' He learns to recognize the size of each ball when he sees or feels it. But it takes him a long time to connect these two habit responses and say, 'This ball is larger than the other one.' When his mind has leaped over this gap, he has begun the great mental feat of *comparison* or *judgment*. But comparisons or judgments are simply formations of new habit systems, the connecting up of the habit system which said, 'This is small,' with the other habit system which said, 'This is large.' By and by he automatically makes these comparisons and without effort judges or appraises the differences among all sorts of things.

"There comes a time still further when the child makes these comparisons and judgments even if *there is no ball or object present at all*, or, as we say, he makes them in his mind. Don't you see that this is imagination—*judging and comparing in our minds things which are not present at all?* It is difficult to separate this from reasoning or abstract thinking or abstract reasoning, because reasoning or thinking is merely making these judgments and comparisons in our minds for some *purpose* or toward some *end*. The highest intellectual processes of which the mind is capable are built up, in our belief, out of these simple elements, these simple habit systems and their connections with one another. We say we reason about economic conditions or about politics, but a large part of our so-called reasoning and most of our judgments in such matters are set by our experience, that is, by our habit systems and the connections among them, which are, indeed, nothing more than other and larger habit systems.

"For example, the Republican, faced by the question or mental stimulus of the tariff, responds automatically, 'Tariff for protection'; the Democrat, faced by

the same question or mental stimulus, responds, 'Tariff for revenue only.' In each case you have simply touched off an old set of habit systems. Of course, conceivably—although this is perhaps a rather violent assumption—they might both go on and reexamine the tariff subject, that is, build up new comparisons, judgments and habit systems, so that, when you asked the question again, they would each give the reverse responses. People who go on through life growing and developing mentally are simply people who never tire of developing new habit systems, new ways of judging, new points of view, new comparisons, all of which tends to keep us alive with fresh and satisfying mental novelty and adventure.

"It would be easy, of course, to pick technical discrepancies and omissions from this hasty sketch of the mental life and the way we build up habit, thought, will and judgment. But for practical purposes, I think it will suffice for showing you how it is that some trivial occurrence, such as fright in childhood, a parent's ridicule or the like, which strikes a deep habit pathway, if not corrected at once, may last all through life and color all one's behavior and view of things. For instance, when you teach your child to draw the letter *C*, suppose that after his first crooked, awkward attempt you had withdrawn the model and he had never seen a good letter *C* again. Would you not yourself be surprised if he should ever draw any better than that first copy he made? So it is when you frighten your child by violent whippings, shutting in closets, threatening him with the boggy man, the policeman and all that. It completely shuts out the *C* by another stronger response and, thus, you never teach him any better reaction than fear. You never develop in him a new habit system. The stronger, deeper habit of fear that you started thus persists, and, as

I have said, it is worse than if you had put out the child's eye or cut off his leg.

"I think, also, this picture of how we form habits and learn to judge, compare and think will show you how a fear of one thing may easily be transferred to a fear of something else; indeed, it may spread over a wide area of the mental life and set up *general* fear of failure and fear that you will not succeed. For example, take the person who says, 'I'm just as afraid as death of a dog.' Now this person may never have had anything but the most pleasant experience with dogs—may never have been bitten by one or have seen any one get bitten. But suppose when you were a child you had had a nurse who had very black hair, and who slammed the door, dropped the basin, talked harshly and punished you so severely that it terrified you. Later you see a black-haired dog in your room and the black hair and harshness of the nurse are, we believe, in some people transferred to the dog.

"Mothers often tell me, 'Why, Willie was frightened the very first time he ever saw a dog.' Well, you can see how that might easily come about. The fear was prepared before he ever saw an actual dog. Later it may be that Willie transfers this fear to other dogs and to other animals until he says, 'I've always been afraid of animals.'

"Or, let us take another simple example: Your mother has been knocked down and hurt by an automobile. Hence she worries excessively about you as a child crossing the street or going outdoors. She worries about your going swimming for fear of your drowning. You get the idea that nearly all boys who cross streets or go swimming get killed or else drown. Your whole outlook gradually becomes 'conditioned' as we say, by this worry of the mother. That was true of the boy I told you about whose parents had him

guarded to and from school for fear little Willie would get hurt. Sometime you may see a dog crossing the street when automobiles are coming by. Your fear widens so it includes both automobiles and dog. What you are doing and what many parents actually educate their children to do is to connect their fear judgments about one situation with their judgments about other situations."

"You do not think, then," I remarked, "that it is wise for parents to frighten their children with the threat that they are going to send for the policeman if they do not behave?"

"I would rather see you deliberately punch my child's eye out than to have you threaten him with the policeman," Doctor Mitchell replied emphatically. "That is, if I were not a psychologist and did not know how we might go about repairing your damage. Why, think of it, that big, burly, good-natured policeman out there on the corner has told me time and again that the mothers of New York make it pretty nearly impossible for the policeman to protect children because they frighten them so about all policemen. He says if the children are in danger and he runs to lift them out, they scream with terror at him and are likely to run into worse danger, trying to run away from him. Just think, we are paying him there to protect our children and then making it impossible for him to perform this service! To repeat his words verbatim he said, 'These parents are damn' fools.' A psychologist would have to exercise great restraint not to agree with him."

"What are you going to do," I asked, "with people who are just depressed and have the blues; they have no *particular* fear, they are just blue and discouraged?"

"Well, as to people who are depressed rather than

fearful, it is sometimes a form of fear; sometimes it is just a way or habit of thinking about life and its difficulties. I find the usual trend of their thinking is this, 'Oh, I'll never get out of this difficulty. I'll never be able to handle this situation. And it's *no use if I did.*' They make no plan, they just go on repeating the same old statements or similar ones that they will never get out of the mess, instead of *formulating a plan of activity*. You just can not be depressed if you are keyed up and driving. *Action is the great remedy for the blues.*

"Let us consider this case: Here is a woman who when she came to me was, as they say, 'so blue you could cut it with a knife.' Nothing was any use, she felt life was just one endless thing after another and not worth living. Well, by inquiry I found there were times in the day when she was idle and she had no set schedule for her days at all. That gave her time to think of her own troubles. The worst business you can get into is to think about yourself and your personal fortunes.

"Now, for this woman I planned a schedule that kept her active *every minute*. That is the greatest cure I know of for the blues. First, her hours for going to bed were irregular, and often she could not sleep. It is a great help to have regular hours. You get the *habit of sleeping*. When she could not sleep of course the next morning she felt depressed from lack of rest; she stayed in bed, complaining she felt too ill to get up. Unfortunately, she did not have to work for her living. For most people this is a great misfortune.

"When this woman would come back, I would go over her schedule in detail and find whether or not she had followed it, *minute by minute*, throughout the entire twenty-four hours. When she would say, 'Well, I didn't do that,' I would insist she should tell me

precisely *why* she did not. Often persons object to this because they know they are usually giving a flimsy reason. I have to be gentle and sympathetic of course, but I keep probing until I induce them to put all their cards on the table. Sometimes I make them feel that if they do not follow the schedule they are not playing a fair game with me. I try to get them into the spirit of the thing.

“I have another woman who came to me utterly blue about life and everything, and here is what she writes me after following my schedule for a long time: ‘I can’t imagine that I am the same person I was two years ago.’ I can not show you her signature, of course, or give you her name, but her blues have disappeared like magic. She can not tell where they have gone. And that other woman I was speaking of, a moment ago,—her blues are rapidly clearing up, just by *not giving herself time to get blue*. People often say, ‘Yes, but I work all day, Doctor.’ In such cases I show them that, even if so, their work is of such a nature that it leaves their minds free to fill up with all sorts of depressing things. The remedy is to get them interested in things *outside of their personal fortunes*.

“Here is a star case—a man who is blue because he is convinced that he never did anything worth doing. Now, I had him write me a letter every day, telling me his whole day in detail and what things he had done which he thought merited commendation. At first I had a hard time to get him to write me one letter a week. It took a whole week for him to find enough worth-while deeds to fill one page. Now I am getting a page or two every day. Some of these things that he thinks merit commendation are really insignificant, but the point is that he is thinking of people and things *outside of himself* and is improving

rapidly. One big business man came to me, saying that he had made money until there was no longer any interest or fun in it and that he was blue as could be. Nothing seemed worth while any more. Well, I have got him interested in welfare work and such things. I'd like to get such people interested in your subject, Wiggam,—eugenics. I think I will try eugenics on the next blue fellow who has too much leisure. It is big, exciting and interesting, and gives one lots to do outside himself. Of course some of these things I have these people do and take them through are very simple, and yet they are the very texture of a man's make-up. They often change whole lives into channels of usefulness and happiness."

"Well, my dear Mitchell," I said, "there is one class of persons I want to ask about. I lived with them in former days for many years on the road; they are such good fellows and I have so many friends among them—that is, traveling salesmen—the Knights of the Grip. I've seen them so often get off key, get so they were afraid to see their customers, so they would walk up and down a dozen times before opening the door to some customer's office to go in. I have seen them sit around the hotel so blue that they could not go out and hustle for business. They would make the excuse that it was raining or they didn't feel well or something. And when they did get in to see their prospect, their hearts were in their mouths and their breath was short and their voices were unnatural. What can you do for those men?"

"Well," replied Doctor Mitchell, "I have a lot of sympathy for those men and women. They live under unnatural conditions. I get letters from traveling men from Maine to California asking me to prescribe some simple remedy for all their troubles. Of course, I can not do much unless I have them for frequent con-

sultation. Every case is a little different. Still, there are a good many things in common. Their difficulties are nearly all just variations of the one thing, namely, fear; and usually these fears have been years in developing from some trivial condition or circumstance.

“Here is a good example—a forty-two-year-old man whom I have had under observation for a year, a man who was trained as a civil engineer before he went into salesmanship. He had some friction with his employer as a civil engineer, but quit his profession chiefly because he thought he would never make as much money as he should, and he thought he could do better at salesmanship.

“His first job was selling brushes and miscellaneous articles from door to door, just to get experience in selling. Of course he met with a good many rebuffs. Then he went with a big filter company selling to the trade. He found, however, his chief trouble was screwing up his nerve to go in and open up on his prospects. He thought of himself as being inferior somehow, in fact told me he thought he had an ‘inferiority complex.’ I have already shown you that the so called ‘complex’ is merely a habit system. You can call it a ‘complex’ if you want to make it seem hard to understand and more difficult to overcome.

“This man, after wandering up and down a long time in front of a store or office door, soon found he just had to take himself by the nape of the neck and drag himself in. You see, he went in thinking of the difficulty of facing the job instead of *thinking of the thing which he was going to do.*

“Now, there were two important factors in this situation: First, there were his frequent changes of jobs. He had changed jobs from dissatisfaction with *himself or something* several times while an engineer.

He always thought he was not progressing as he should. But I found that each time he gave up without giving the job an adequate try-out, and this made him start on the next one a little less sure of making good. That was really the background of his feeling of inferiority. As he saw it, he had tried these things and fallen down; as a matter of fact, he had never thoroughly tried any of them. This led him to exaggerate his failures and to repeat to himself all the time the fact that he had not made good. He never happened to think that it was his own attitude and not any real thing which was the trouble. He was all the time telling himself he was a failure.

"This brings up one point I wish to emphasize again about fear. If you will get up the most fantastic story and tell it to a dozen friends as having happened to yourself, you will soon begin to feel that it is a fact. It will surround itself in your mind with all the emotional halo it would have if it were a fact. It is just the same thing if you tell yourself a hundred times a day, as these people do, that you are 'no good' and are going to fail. The essential thing is to get them to realize that they are undermining themselves by telling themselves constantly about their own inadequacy. I have to make them realize that it is just as bad as if some one else told them the same thing.

"I had to prove to this man his own ability as I so often have to do. I showed him, by mental tests, that only three people out of every hundred could *possibly* be his equal or superior in intelligence. This means he was abler than the average college graduate. A great many professional traveling salesmen are, I imagine. He had never thought of himself in that light. I showed him that among his customers it would be the rare exception who would be his mental equal. Then instead of thinking of his inferior abil-

ity, I urged him to think of his superior ability and also to think of the number of things he could do well which they probably could not do at all.

"I had him go through the usual process I have already described of comparing his performances with others. And, as I often do, I guided him somewhat to list performances in which I thought his customers would likely not succeed as well as he would. For instance, as a machinist, he ranked himself better than ninety per cent. of machinists. As a baseball player, he listed himself better than ninety-five per cent. And so on. When it came to actual selling, closing a sale, he said, 'I am most successful in selling, especially in dealing with the best-informed men. I lack the volume of small orders but in dealing with big buyers, I rank among the best.'

"Now, when he was pacing up and down, screwing up his nerve, I had him take out his list and compare himself with his prospective customer. Often the offices he visited were richly furnished, the man behind the desk was wealthy and well groomed and all that. But I urged him to imagine that he had that fellow on the gym floor or baseball field or as a machinist and to think how much better he would show up under those circumstances than this forbidding, important-looking customer. In that situation it would more than likely be the other fellow who would have to take a back seat.

"Well, by seeing him now and then the past year, and working along these lines, he is making decided progress. He is increasing his sales, meeting people better, and is much happier in his job. Instead of making a general 'pep' talk to him, I showed him how to manufacture his own pep. I find these so-called inspirational talks are mostly bunk. You have to take discouraged people through a list of *specific ther-*

apeutic measures, get down to dots and show them how to create their own inspiration. Of course sometimes a little encouragement is helpful, just as a stimulant is in pneumonia. But putting these men through concrete performances and methods is like removing the infection itself, because that is the only way by which you can create new habits to replace the old habits of fear.

"I had another salesman who was having a lot of trouble with himself. He was a young man, only twenty-five, graduate of a military college, one of the finest in America. He had been a salesman for three years with a big rubber company after leaving college and had quit to go into real estate. He was in real estate only a little over a year when he came to me in a state of blues, and broke down and wept with discouragement. He had tried several inspirational, pep-producing courses, but with no beneficial results.

"He was afraid he would not succeed. 'I just have a growing sense of inferiority,' he said, 'and always keep hoping that some deal, some stroke of luck will put me on my feet; then I feel sure I would be all right.'

"When he said that, I sensed something immediately. I felt sure he had at one time had some stroke of luck and was all the time pining for the lightning to strike him again. It is interesting to note that about ten per cent. of all the cases I get are those of people who have at one time had a temporary streak of good fortune, made a big sale or turned a good trick of some kind that made money. This made them, for a time, feel important and successful; and when that temporary spurt was over they found it hard to get back to the old every-day, penny-at-a-time job. That is what makes it so hard for people who have had financial failure to begin over again, although they are

no worse off, frequently not so badly off, as they were when they first began.

"So I questioned this young man and found that when he quit the rubber company and went into real estate, he had made a fortunate stroke and made more money in a few weeks than in his whole three years of selling rubber. He at once thought, 'This is sure the candy; it's going to be a joy-ride.' Well, you can be sure if real estate or any other job were a *continuous* joy-ride, we would all quit our own jobs before night and go into it. The bottom fell out of the real estate boom where he was, and at once it proved hard sledding to make more than a bare living.

"I found this same thing with a lot of my people, especially salesmen, after the war and the big drop in business in 1919. People who had been coining money as salesmen found themselves suddenly up against it. Indeed people did not have to be real salesmen during the war to sell things. Thousands of men and women were in salesmanship who, when competition came and it was a hard drive to get business, could not measure up. Many of them had no training nor special fitness. And they were blue and sick and discouraged when the slump came, and it took a lot of readjustment.

"Exactly the same thing happened to this boy. After his temporary streak, he found he was up against the real thing; and after a year of this severe, grueling competition, he came to me with the notion he was a failure. Of course one of my chief jobs was to show him that his first success had been due, not to his own brilliant salesmanship, but to special conditions which had now disappeared. I showed him that he would have to face in reality the fact, as I have said, that there are some things we can change and some things we can't. I have had a dozen salesmen and

other business people in here in the last three months whom I have had to show that they must adjust themselves to a lessened turn-over. I urge every traveling salesman or business man, when he has had exceptional success and then runs into a hard period, to forget the former and quit mulling over his big fine days, and meet the situation actually before him. It does not help us a particle to remember the Garden of Eden. These people have to turn their minds from this reflecting upon their past successes. That was just what I did with this young man. He was imbued with the idea that he must make some other big stroke and get away ahead all at once and I have had to get him adjusted to the plain facts.

“I had another star example of this in my office Sunday last, a man of fifty-one, who was obsessed with the fact that he had at one time received only five dollars a week and yet had sold three thousand dollars’ worth of goods a week for his employer for which he thought he ought to have received one hundred and fifty dollars a week. Maybe he should, but that had been years ago, and yet he was still discouraged about his salary, because he was not earning one hundred and fifty dollars a week, although he was not now selling anything like that much goods per week.

“With such people, I have a little example or scheme that helps. I ask them how many persons during their lifetime will be elected president of the United States. We assume it is about ten. During the same period we find by a little talk that about sixty million people will be born. We hear it said that anybody can become president. I ask them what they think of that when there is such a job for only ten persons out of sixty millions. I say, ‘Your chance of being president is not very strong, is it?’ They had never thought of it in just that light.

"I also often refer to the Klondike gold rush and point out the fact that the dozen or more, out of the hundreds of thousands who went, who struck it rich were heralded all over the world. I was myself, shortly afterward, out over the trail that the Klondike rushers followed from Edmonton west across the Peace River District, and I talked with people who had seen the Klondike rush. They told me stories of people who got only five, ten or fifty miles from Edmonton and then turned back, after having sunk all they had in the world in an outfit! There were thousands of them, and yet the Klondike was still eighteen hundred miles farther on!

"These people I have, most of whom are sensible people, usually see the point at once and face reality right there. A man not only gains nothing but loses every time he tries to dodge facts. The only way to meet facts is to meet them. And going back to finish the story of the boy who had a brief run of luck in real estate, I now have him at the point where he says he had the whole thing sized up wrong. He has secured another job, at fair compensation and has begun taking courses in business, finance and economics, and is equipping himself to be a bigger stronger *person* than ever; he is equipping himself to do a big job before he expects to do it. He is much happier, quite satisfied, keen for his work, and his difficulties are now practically behind him."

"Don't you," I inquired, "sometimes get old seasoned salesmen who are in the dumps and feel that there is something the matter with them?"

"Yes, I get them right along, but it is practically always some form of that same old thousand-headed monster, fear. Here was a man, now aged thirty-five, who had been a big salesman from the time he was twenty-five until he was thirty-two, making from fifteen

thousand dollars to twenty thousand dollars a year. Yet, notwithstanding brilliant records for the past two and a half years, he has been falling down. He was entirely out of a job when he came to me about a year ago. He had been out for over two months and had been around, seeking some connection. Still, while he was in a way seeking a job, he was secretly hoping he would not find one, because he was afraid he would not make good if he did. The last two or three years of this falling down on his former big record had sapped his nerve and confidence. But I think he would have stood that all right, had it not been that behind that there was another situation of very great importance.

"That situation was this: Notwithstanding he had been a big salesman and made a big record, *he was still under the domination of his mother*—still tied to her apron strings. If mothers only knew what they are doing to the boy that they are trying to hold to themselves—what they are doing to his courage, his nerve, his self-respect, his confidence—well, even if they knew, some of them are so selfish that they would do it anyhow because they think nature has given them this boy for just their own personal property. The big thing parents should do is to develop the boy's independence of them as soon as possible, so that he will stand squarely on his own and develop his own habits of judgment and action.

"Well, this mother had always insisted that she make every important decision for her boy although he was now thirty-five years old. She had drilled into him that he could not make them for himself and that made him feel that he really could not do so. She had even vetoed his plans for getting married, and the poor fellow had stood for it."

"The big boob!" I exclaimed.

"No, I would not call him that," the doctor replied kindly. "It isn't his fault. You take a boy from his cradle up and drill into him every hour he is awake that he is not capable of making decisions for himself, and you make him afraid to turn around without asking his mother or father or some one. This mother had made this boy that way and made him forego his plans for marrying, until she found a woman that she approved. Well, you may be sure that she will see to it that he never finds such a woman because she is determined to keep him tied to her.

"So, here he was, a big capable man, still letting his mother decide on his wife and his shirts and everything else. As a direct consequence, when he came to me he was pretty much of a wreck. I gave him intelligence tests and he was so disturbed mentally that he fell down on them far below what I am convinced he could have done. We have to watch, in giving intelligence tests, to see that the individual is in a frame of mind to do his best."

"What on earth do you do with such a fellow?" I asked.

"We can not always do the same with each one. But I had him go out and scout about town, investigating various sorts of jobs and situations in which he thought he might be able to do well. Sometimes I had him stay at home and work out some possible position, imagining himself in it and outlining details as to how he thought he would get along. I had him bring written reports to me on all these situations, both real and imaginary, and I went over them in detail with him. For the first few weeks I had to show him that it was almost invariably the case that he was dreaming of impossibilities, thinking of his former income of twenty thousand dollars a year and all that and failing to face realities.

"As an instance, although he had little or no capital, one plan he had was that of renting a store at fifteen hundred a month of which he was to be the manager. Another was a manufacturing concern he had all planned out; he showed me how he would install the machinery and how he had the sales force all organized. He was going to finance it by borrowing in advance up to one million dollars, using as collateral the sales which he was sure he was going to make. I pointed out that banks required real and not imaginary collateral. You see, all the time he was not facing facts at all, but dreaming of *himself* as an important, successful person. A large proportion of business failures comes just because men are dreaming of *themselves* as important, successful persons, like neighbor Jones or Brown, and are not facing the dollars-and-cents features of the situation.

"Step by step, however, I induced this man to get down to brass tacks and finally we got him into a one-hundred-dollar-a-week job, selling ladies' dresses. In a short time you would scarcely have known him for the same man who came to me in such a messed-up shape. He got his bearings in excellent form, forgot about his former successes, got down to business and is now sailing along all right. He takes a normal view of life, and I am sure is going to have no further trouble."

"But," I inquired eagerly, "did he break away from his mother?"

"To a large extent, yes, and he is doing better in that respect all the time. He is more and more deciding things without consulting her. These over-mothered men are certainly pathetic propositions. I get them here at all ages—twenty, thirty, thirty-five, forty. Not so long ago, I had a man here past forty. You could just see his mother's

apron strings dangling around him. He sat here and cried like a baby about decisions that were overpowering him, and yet they were ordinary business decisions that could easily be handled by any intelligent, independent schoolboy of fifteen. His mother had always told him when to go out and when to come in and whom he should have for his friends. And such a man never has many, if any, real friends. This one lives up in Syracuse and was down here on a business trip when he heard about me and came in for a consultation."

"But I can not see how he came to get up the nerve to consult anybody besides his mother. Where was she?" I inquired.

"That is the comical part. For once she let him come alone; and when he got down here a little business decision came up which he was forced to make, and he was at sea without a rudder or compass. So some friends sent him to see 'that man Mitchell.' Well, I haven't got very far with him yet, but he is coming along all right and I feel confident he will in a year or two make a new man of himself. It is not some mysterious trick of mine to change these people; they do it for themselves when they once see how. It is perfectly true what Herbert Spencer, the English philosopher, said, 'The only real education any man ever gets is the *education he gives himself.*' I merely show them how to reeducate themselves on sound lines; this new education takes the place of the false education they have had hammered into them.

"This man may even get a wife in time, for, of course, just like the other fellow, and like nearly all these over-mothered men, he has never found a woman his mother thought was good enough for 'her little Willie.' *Such mothers see to it that little Willie does not find such a woman.* Parents ought to recognize

that they are responsible for weaning their children away from them to a life of independence. I have a fine case that shows how they work this deal. The mother owns up to it. She has a fine, well-grown, husky youngster of over two years of age, but she is keeping him breast fed with the notion that when he grows up he will not leave his fond mama. And he likely will not. He will probably grow up into a man afraid to face life with hope and confidence, and afraid to make decisions for himself. Parents should recognize that their greatest task is to prepare their children for *healthy, self-controlled freedom*.

"I have just such another case—a woman this time, who has been dominated by her father. She will not compare herself with other people on my schedule. When she rates herself low on a performance which I know she can do well, she says to me with a sheepish grin, 'I wouldn't dare rate myself high on that.' She is afraid she would have to make good on her own ratings; and her father has taught her that she could never make good on any worth-while performance. I have had actually to train her to look me in the face. Many of these people when they first come to me are timid and sheepish and look the other way while talking to me. They get the idea that if they appear modest and retiring that others will not be so harsh toward them in their judgments.

"At first I could only get this woman's eye now and then for a fleeting glance. Then in a few weeks she would look at me for ten seconds. Next I had her tell me stories which required just thirty seconds to tell and made her look right at me all the time. This has greatly improved her fears of other people. Just to-day I added another step—requiring her to look at strangers when she talks to them. I think I will have her in a few months so that she can go in and face

the general manager or Grand Mogul and, without effort, look him easily in the eyes.

"I guess, if I get them so they can look at me without getting scared they will be able to look at anybody," smiled the doctor genially. "That is really the big thing, to get them to face reality, look facts squarely in the face—to live in a real instead of an imaginary world. For these fears are all unreal. They have all been learned because there is *nothing* in the actual conditions of life to base them on. Oh, yes, they *look* real enough to these people until you show them that what they are frightened at is a stuffed boggy, and that they are merely carrying on some old habit system learned years and years ago."

The doctor and I had talked until long past midnight. I rose to go and the doctor said, "I'll get my hat and coat and walk a little way with you to get some fresh air before I go to bed."

As we walked up the street in the cold winter starlight, the snow crunching under our feet, Doctor Mitchell spoke with deep feeling about his hopes for the future education of children to free them and to free the world from this age-old burden of fear.

"I tell you, Wiggam," said the doctor, "some day, and that very soon, I have great hopes that we are going to revamp our whole system of education and with it revamp our ideas as to what makes an educated man or woman. Any one who is afraid, fearful of failure and that he will not make good is not in any true sense an educated person. Soon we shall educate children to have a clear idea of the actual conditions of life that each one of them is going to face, without exaggeration either way, and we shall show them clearly the ample powers they all have by which they can surely and safely face them.

"We shall do away with the inspirational bunk

which insists that any one can do the impossible. Instead of setting tasks which are possible only to extraordinary men under extraordinary circumstances, we shall teach each person what is possible to him under ordinary circumstances. And I know, from long experience, that people are happy, contented and unafraid with that, however humble their proper job may be. This does not mean that we shall not give plenty of inspirational encouragement. We all need that. But it means we shall base our inspiration on facts and not on fancy, on what each person can do, instead of on what most of us can not do.

"We shall begin first with the parents and show them that when they talk fear and lack of confidence in the home, when they dominate, threaten, frighten and ridicule a child, they are wounding his mind and heart, marking him with the brand of fear and failure for life. We shall next take the school and the teachers and show them the folly of setting tasks for children at which over one-half are bound to fail. Finally, we shall take the child, find out each one's potentialities, and train these to their highest efficiency. By this method we shall give every man full confidence that he has ample abilities to meet all the world's *actual* problems, trials and difficulties. And this sort of education will place *every* man in the job he can do best and he will find that that is the job, likewise, that he likes best.

"When we educate people in that way—and *we can begin right now*," concluded the doctor fervently, as he took my hand in his powerful grip to say good night, "we shall banish fear from the world, and personal failure will be unknown."

The following is a list of fears that Doctor Mitchell has found are very common among normal people. You will likely discover your own particular fear

somewhere in the list. If so, you will find the accompanying chart for comparing yourself with other people of the very greatest value in overcoming your fear. It is the actual chart of an actual person whose initials are A. K.

Not being able to get a job.

Not being able to satisfy in the present job.

Not being able to hold the new job, if obtained.

Not being able to meet strangers.

Not being able to talk to the boss.

Not being able to meet subordinates and maintain authority.

Not being able to meet customers.

Summing up, Doctor Mitchell finds the following proportion of fears among normal people:

Fear of failure	75%
Fear of the dark	16%
Fear of thunder and lightning	16%
Fear of animals	13%
Fear of water and drowning	12%
Fear of falling from high places	4%

In addition, Doctor Mitchell finds a great many normal people have the following chronic fears:

Being alone	Taking an anesthetic
Traveling on trains	Fast driving
Crossing a bridge	Insanity
Old age	Injuring others when driving
Death	Excessive heat
The dead	Getting lost
Poverty	Points or sharp edges
Fire	Big eyes, mouth, or teeth
Being kidnapped	The opposite sex
Ghosts	

Burglars	Punishment and its instruments
Firearms	Disease and germs
Being buried alive	Loss of friends or relatives
Being locked in	Bad luck—the number 13, etc.
Dark holes	Skeletons
Disappointment	Very narrow or wide-open spaces
Mediocrity	Becoming a drug addict
A cellar	An eclipse
The sight of blood	Machinery
The dentist	A locomotive
An oft-repeated dream	
An insane person	
The end of the world	

Among the creatures which many normal people say they are “deathly afraid” of are:

Rats	Wild animals	Caterpillars
Mice	Bulls	Spiders
Snakes	Horses	Pigs
Dogs	Bugs	Toads
Cats	Beetles	Cows

HOW TO COMPARE YOUR ABILITIES WITH THOSE OF OTHER PEOPLE

Nothing is more valuable in building up your self-confidence than to compare yourself *item by item* with other people. You lose your confidence by a *blanket* judgment of your inadequacy. You build it up by an *itemized* judgment of your actual abilities.

In the accompanying chart, Mr. A—— K——, an actual person, has rated himself and ten other persons in fifty significant performances. Mr. A—— K—— had an overpowering fear of failure. This was his blanket judgment. Had his belief in his own inadequacy been true, he would have rated himself 1 on all these performances, and his friends 5. This would

have given him a total score of 50 and his friends a score of 250.

But when he rates himself, item by item, his actual score in these 50 skills is 176. He thus has $3\frac{1}{2}$ *times the ability that he thought he had*. He rates only one person, Mr. B——, above himself; namely, 220. Only two have ratings near his own, Mr. E——, 173, and Mr. I——, 170.

Thus, in his own carefully analyzed judgment he is superior to nine out of ten of the very persons he is afraid of.

The following rating chart is given merely as an indication of the wide and varied range of performances you can use for comparative purposes. In making up your own list, you will doubtless prefer to substitute other subjects for some of those given here. For instance, if you are a woman, you will substitute more feminine occupations and talents for the purely masculine ones contained in the chart, and vice versa, so that your rating will have a real comparative value.

Performance Rating Chart of A. K.

	A. K.'s			Rating of Ten Friends							
	Self-rating	A	B	C	D	E	F	G	H	I	J
Sing a solo	5	3	1	1	4	2	2	4	5	3	1
Play the piano	4	2	1	1	5	2	3	3	3	3	4
Paint a picture	1	1	2	1	5	1	2	5	3	3	5
Drive a car	5	4	5	4	1	1	3	1	1	1	4
Cook a meal	4	5	5	3	5	5	5	1	1	4	4
Make a dress or suit	5	2	1	1	3	3	5	1	3	3	4
Build a house	1	1	5	2	1	2	1	1	1	1	1
Grow flowers	2	4	5	1	4	4	4	1	1	2	3
Run a typewriter	1	3	4	1	1	4	5	4	1	1	5
Keep accounts	5	3	5	3	5	5	5	4	4	5	5
Lead a scout group	2	2	5	2	1	3	3	4	1	3	1
Tell an interesting story	4	1	5	3	3	5	3	5	3	4	4
Set up a radio outfit	1	4	5	3	1	1	1	1	1	1	1
Repair a motor	1	5	5	1	1	1	1	1	1	1	1
Review a book	4	1	5	3	3	3	3	5	3	4	3
Criticize a play	5	1	4	3	3	2	3	5	3	5	3
Write a story	5	2	5	3	3	5	3	5	3	4	4
Play tennis, baseball, etc.	1	4	5	4	1	1	3	1	1	3	3

	A. K.'s			Rating of Ten Friends							
	Self-rating	A	B	C	D	E	F	G	H	I	J
Play cards	3	5	4	4	3	1	5	2	3	5	1
Dance	5	4	1	3	2	1	3	3	3	5	5
Write letters	5	2	5	3	4	5	3	5	4	5	4
Report a speech	5	1	5	3	5	5	5	5	3	5	4
Memorize poetry	5	3	5	3	5	5	4	5	4	5	4
Sail a boat	1	1	5	3	1	1	1	1	1	1	1
Swim	1	4	5	5	1	1	4	1	2	5	2
Care for animals	4	2	5	4	5	4	5	2	3	5	5
Carry on conversation	5	3	5	3	4	5	5	5	4	5	3
Preside at meeting	4	2	5	2	4	5	4	4	3	4	3
Take part in a play	5	1	3	3	3	4	3	5	4	5	3
Make or repair furniture	1	4	5	2	2	2	1	1	1	2	2
Decorate a room	4	4	4	3	5	5	5	5	4	4	4
Repair electric light- ing system	1	5	5	2	2	1	1	1	1	1	1
Teach a class	4	2	5	1	2	5	3	4	2	3	1
Sell real estate	5	3	5	2	2	4	3	3	1	2	1
Make a speech	5	1	5	1	2	5	2	5	1	3	1
Organize a political campaign	3	1	5	2	2	4	2	5	1	2	1
Paint a house	2	4	5	5	2	2	2	2	1	2	1
Diagnose physical ailments	3	2	3	4	3	3	2	1	1	2	1
Care for children	4	1	5	3	5	5	5	1	3	4	4
Keep a house in order	5	2	5	4	5	5	5	1	2	4	5
Exercise tact	5	5	5	4	4	5	4	5	5	5	2
Supervise the work of others	3	5	5	3	3	5	3	3	2	3	2
Follow instructions	4	4	5	4	5	5	5	5	5	5	4
Sing in a chorus	5	3	2	3	5	3	3	4	5	5	4
Influence other people	4	3	5	2	3	5	3	5	3	4	2
Conduct a business	3	4	5	3	2	4	3	3	2	3	2
Sell automobiles	4	2	5	3	2	3	3	5	1	3	1
Act as host or hostess	4	1	5	4	4	5	4	4	4	4	3
Control unruly child	4	1	5	3	4	5	4	1	1	4	3
Make and retain friends	4	3	5	4	4	5	4	4	4	4	2

176 136 220 138 155 173 164 158 123 170 138

CHAPTER X

HOW SMART ARE YOUR CHILDREN?

FROM vague guesses about ability and what constitutes mental superiority, Prof. Lewis Madison Terman has done as much as any student of the mind to rescue psychology and education. Professor Terman was born in Indiana in 1877, was graduated from the State University in 1902, and received his Doctor's Degree at Clark University under Stanley Hall and his colleagues in 1905. In 1908, when Binet, the French psychologist, devised tests of mental abilities, Terman was one of the first men in this country to realize their importance, particularly Binet's conception of mental age as related to chronological age in children. His work has greatly clarified the ideas of psychologists as to what intelligence is and how it may very early in life be discovered and measured. From 1906 to 1910, Terman was professor of child study at the State Normal at Los Angeles, and has been at Stanford successively as assistant professor of education, associate professor and later professor and head of the Department of Psychology since 1910. Since 1922, he and his associates have carried on an extensive research to discover the characteristics of gifted children, a research upon which Professor Terman talks interestingly in the following chapter.

X

How can you tell an extraordinarily gifted child when you see one?

May not your child become a genius?

What is a bright child like, anyhow?

What are the signs and symptoms by which you can tell whether your children are bright, dull or just average?

Were not most geniuses exceptionally dull, or at least very commonplace, as children?

I journeyed across the continent to ask Prof. Lewis M. Terman these and a hundred similar questions, because he probably knows more than any one else about gifted children, their traits and characteristics, and whether to push them ahead or hold them back, and how to treat them generally.

He has gained this knowledge because twenty-five years ago, as a country school-teacher in Indiana, working his way through the State University, and fighting tuberculosis at the same time, he began to study the problems of stupidity and genius. In 1905 he received his Doctor's Degree from Clark University by further experiments in measuring the minds of children.

Doctor Terman had scarcely finished his graduate work, when, in 1908, a great French psychologist, named Alfred Binet, discovered a method by which to measure the "mental age" of children and compare it with their physical age. Terman was one of the first psychologists to grasp the great significance of this suggestion and he worked for eight years at the Los Angeles State Normal and at Stanford University, extending and revising Binet's methods. Indeed,

he and the many students he has inspired are still carrying on this work.

"But, my," Professor Terman said to me, "how little we knew prior to 1908! I worked several hours a day for six months in those earlier years of the century, trying to measure the minds of a group of fourteen children. I knew scarcely more at the end of that time by which to predict their future than at the beginning.

"But any one of my senior students can now measure a child's mind better, and predict its future with far more certainty in one hour than all the psychologists in the world put together could do in six months twenty years ago."

In 1916 he published his famous *Stanford Revision of the Binet-Simon Intelligence Scale*, by which the minds of hundreds of thousands of children and adults all over the world have been measured. The method was used extensively on the soldiers during the war, along with other mental tests, and a large majority of these men turned out in actual performance just about as the mental tests predicted.

Five years ago, Professor Terman, now head of the Department of Psychology of Stanford University, at Palo Alto, California, gathered about him a group of able assistants and, equipped with these mental tests, they began to search for a thousand exceptionally gifted children in the public schools of California. One evening last autumn Mrs. Wiggam came home to our New York apartment, bringing a huge red volume of six hundred fifty pages entitled, *Genetic Studies of Genius*, which, the preface said, was a *brief* account of this wonderful investigation. In the original files this investigation covered over one hundred thousand pages of typewritten material—a hundred pages of information on each child.

The book was bristling with facts and figures, charts and diagrams. She read aloud to me until midnight, and then said wearily, "Let's go to bed." I said, "No; let's go to California. I want to see and talk with the man who has turned a thousand precocious children inside out. I want to see what he found inside. I know it is of immense value to parents, teachers and employers everywhere."

As a result, within ten days we were sitting with Professor Terman in his study and workshop in his beautiful Palo Alto home, where he talked to us for nearly two days about these remarkable children—their intelligence, will power and aptitudes; their health and physical measurements; their interest in games, sports, vocations and social activities; their stick-to-it-iveness; their inventiveness and capacity for leadership; their foibles and hobbies, achievements and moral development. I wish every parent and teacher might have shared our privilege.

Of course, just as you would have done, the first question I asked was, "What was your object? Did you want to find the one thousand most gifted children in California?"

"Oh, no! We wanted to find several hundred exceptionally gifted children of all sorts and varieties, in every kind of family, class and condition, so that parents and educators everywhere would have a true knowledge of the signs and symptoms of exceptional ability, and how children of this sort compare with average children. We have been guessing about these things ever since Adam and Eve, and we wanted to learn the truth. We hope, also, to follow these bright children through the coming years and compare their careers with those of average children. Also, we hope to devise better methods for handling and educating unusually bright children in both home and school.

"So we went into the public schools, concentrating especially in Los Angeles, San Francisco and Oakland, where the schools take in all classes—the children of the rich and the poor, the professional and the business people, the skilled and the unskilled classes alike. All told, these schools enrolled about a quarter of a million children. Dr. Florence Goodenough, with a corps of trained assistants, was in charge of the field work.

"Those we call our 'main group' were mostly in grades three to eight, which means they run from six to thirteen years of age. There were 643 of these—352 boys and 291 girls. Besides these, we had a high-school group of 309—200 boys and 109 girls. I wish you would notice how many more brilliant boys we found than girls. We will talk about that later. We had another group of twenty-six children who were said to have special abilities in music, drawing and the like.

"This gave us 978 gifted children to study. Of course we also had to have several other groups of average children taken at random, for making comparisons. In this way, we found out a great many new things about the average children as well as the gifted. We hope soon to issue a special volume on the average children. Average children have extraordinary traits and characteristics also."

"How did you actually pick out these brilliant youngsters?" I inquired. "Men have hunted big game, but I believe hunting geniuses is the most thrilling hunt a man ever started on. It must have been an exciting chase."

"Well, yes, it was exciting enough," laughed Professor Terman, "and as full of surprises as any big-game hunter could desire. We decided to use the word 'gifted' to designate those children precocious enough

to have an 'IQ' of 140 or above. This standard is probably reached by about one child out of two hundred in America.

"That term 'IQ' is now a good English expression, and every parent, teacher and employer should know its meaning. It means Intelligence Quotient. We obtain this quotient by dividing the child's physical age into his 'mental age,' the latter being determined by our tests. For instance, a ten-year-old child that can pass the tests which children generally can not pass until they are twelve, has an IQ of 1.20; that is, ten divided into twelve. For convenience, we write it 120, disregarding the decimal point. If a ten-year-old can pass only the eight-year-old tests, we divide ten into eight, which gives the child an IQ of 80.

"Children whose IQ is below 65, are usually feeble-minded. The average run of children, of course, have an IQ of about 100. Some of these gifted children had IQ's as high as 180 and 190. It is probable that such great men as Milton, Goethe, Newton, Galton, John Adams, Thomas Jefferson, Hamilton, Emerson, Agassiz, Longfellow, Dickens and the like had IQ's between 180 and 200. Our hope is that some of the children we have studied will turn out to be great statesmen, great scientists or great poets. Twenty-five years from now, when we can read their life stories *backward*, we shall know how true our hopes and predictions have proved."

"Just how did you pick out these children? Did you merely ask teachers and parents to select their brightest ones?"

"By no means," was the reply. "Parents and teachers are so frequently wrong that we had to devise all our elaborate testing machinery to overcome their very imperfect estimates. For example, a minister who had two extraordinary children said, 'Oh, no,

they're no brighter than their playmates.' You see, the playmates, in such cases, are also often very high grade. We found other parents and teachers who insisted that some child was a top-notch, when our tests proved the child to be quite ordinary.

"Our first move," continued Professor Terman, showing me a long printed form with the caption, "Blank for the Selection of Gifted Children," "was to send this to the teacher in any room where we desired to search for gifted subjects.

"Two passages in the blank illustrate how parents and teachers are often misled as to what to look for as indications of high intelligence. They read:

" 'Do not base your judgment of intelligence upon *school marks* alone. Important qualities to consider are quickness and accuracy of mental grasp; originality, ability to reason clearly about new and difficult problems, breadth and accuracy of information, intellectual curiosity, command of language, common sense and independence of judgment.'

" 'Do not underrate the bright child who is shy, or lacks industry, or stands low in deportment.'

"The next item is one which brought us perhaps the biggest surprise of the whole research. It has *great* importance to parents and teachers. It reads: 'Name the *youngest* pupil in each grade or half-grade in your room.' We were astonished to find that if you wish to find the naturally brightest child in any schoolroom, you will stand a better show if you merely take the *youngest* child, than if you ask the teacher to name the one she thinks the brightest.

"This is an extremely reliable finding, because we tried it so many times. Indeed, we got about twenty per cent. of all our brilliant children this way, while, by taking the teachers' nominations, we got only about sixteen per cent. It merely shows that it is not so

much what a child can do as *the age at which he can do it*, that is an index of his intelligence.

"The teacher then nominated three groups of from one to three children each as follows: 'most intelligent,' 'second most intelligent' and 'third most intelligent.' Then we also found the youngest pupil, if he were not already in one of these groups, as he often was not, and to all these groups we gave our big battery of tests, and thus made our final selections."

"Do you believe that in this way you discovered all of the children who were bright enough to qualify as being 'gifted,' that is, who had an intelligence quotient of 140?"

"No, I think we missed a few. For instance, we had some experiences like the following: One day we asked the teacher in one room to give us the name of the youngest child. She went to her record book and looked down on one side at the birth dates and got the child with the latest birth-date. As her finger crossed the page to get the name of the child, it wobbled and she accidentally gave us the name of the child just below the one she should have given us. So this child was sent up to be tested and, out of that school of about three hundred children, this was the only one that qualified for our gifted group.

"Another accident we had was a case where the youngest child was not there that day. The teacher thought the sensible thing would be to send us the next youngest child. Now, it again happened that this was the only child in that classroom who was bright enough to qualify. We also had another accident similar to this. So, this rather disconcerted us as to the reliability of our procedures.

"In order, however, to check up, we made a second survey in two schools, one in San Francisco and one in Los Angeles. We went through the same classrooms

and had the teachers nominate the brightest that remained, also the second and third brightest and the youngest. We found after testing these that, had we stopped at the first survey, we would have lost about twenty per cent. of children that could qualify.

"We also checked up our methods by another experiment in some of the schools of Santa Barbara. We first selected the brightest children according to our usual methods and then our field workers went right ahead and tested all the children that remained. We found again that we had missed about twenty per cent. of the ones that we called gifted."

"Do you argue from this, Professor Terman, that, taken as a whole, you missed about twenty per cent. of the brilliant children by your methods of survey?"

He replied, "No, I hardly think so. Our field assistants are pretty well convinced that we missed much fewer than twenty per cent. Our reason for thinking so is that in those two schools where we made a second survey in San Francisco and Los Angeles the children were of very high average grade. In fact, in one school one child out of every twenty-eight qualified. So in a school of that high grade, we would be much more likely to find other children that would qualify than we would in a school where the children were of lower average intelligence. In some schools we found only one gifted child of our standard among five or six hundred pupils. In such a school, a second survey very likely would have discovered that we had not missed anything like twenty per cent. You see, if you go into a school where the average is rather low and there is a bright child there, he stands out so that you are pretty sure to get him.

"But, after all, it does not matter much as far as our ultimate calculations are concerned, because if ten or even twenty per cent. are missing in as large a group

as we secured, your averages as to the characteristics of bright children in general would not be greatly affected. That is, the other ten or twenty per cent. would almost certainly be very similar to the eighty or ninety per cent. selected."

"After you have made this preliminary selection, you speak of having given them a great many tests. What was the battery of tests that you used?" I inquired.

"They are too long to describe here in detail. We first gave them two intelligence tests. The two scales we used were the Stanford-Binet, and a scale known as 'National B.' This gave us their IQ's and we dropped all who scored below 140. Then we gave them a two-hour achievement test, in order to find out exactly what mastery of the school subjects they had achieved. We spent five thousand dollars in devising this one test alone.* We felt justified in making this expenditure because no very reliable tests had, up to this time, been devised for determining how thoroughly a child has mastered his school subjects. We found the school marks to be very unreliable. Before intelligent provision can be made for the education of gifted children it is necessary to know what their accomplishments are under the present system; whether they are being unduly retarded; whether their accomplishment is better in some subjects than in others; whether they show an excessive tendency to uneven performance in different subjects, and the like.

"We were thus able to work out an educational or subject quotient similar to our intelligence quotient for each child of a given age. The tests covered such subjects as language, reading, arithmetic and spelling. We found that on the average the subject quotient, or

*The Stanford Achievement Test is published by the World Book Company, Yonkers, New York, and can be purchased from them.

educational quotient, was about four-fifths as superior as the intelligence quotients. This showed that the superior children were not so advanced in their subjects in proportion to their superior ability to master those subjects. In other words, their superiority in intelligence above average children was about fifty per cent., whereas their advancement in mastery of subject-matter was only about forty per cent. above average children. It is of extraordinary significance, however, that in grade placement these same children were in general only about fourteen per cent. ahead of average children. In other words, the bright child is ordinarily held back by the school authorities, often by as much as two or three grades below that in which he rightfully belongs; when we consider it this is certainly an unfortunate waste, both in the life of the child, and in the money being expended upon his schooling.

“In addition to the foregoing, we gave the children a fifty-minute test, to find out their general information about science, history, and their knowledge of the world in general; also, we gave them a fifty-minute test to find out how much they knew about plays, games and amusements. I shall tell you something later as to what these tests revealed.

“The children also had to fill out a four-page blank telling us their interests in school subjects, vocations and life generally, and each child had to keep a two-months’ record of what he had read, and write out something about the impressions his reading made upon him. I want later to make a few remarks on this matter of what a child’s reading should indicate to his parents.

“In addition, the parents and teachers had to fill out twenty-four pages of blank forms, giving us their own estimates and accounts of the children in great

detail. And, when possible, we secured a standardized rating of their homes, including such items as furnishings, neatness, books, parental guidance and the like.

"This gave us nearly one hundred pages of information about each child, nearly one hundred thousand pages all told. This is all locked up in a great range of files, so that no information that would identify the children can ever reach the public. We believe this would make the children self-conscious, either shy or snobbish, and have a bad moral effect. It might also embarrass the parents who have so generously co-operated with us."

At this point I remarked, "For the benefit of persons who might like to test either themselves or their children, I wish you would describe just how you go about measuring a person's mind. Millions of children are being tested every year in our schools, and, to most parents, just how you go about it and what it all means is quite a mystery."

"Well, it takes an expert to give tests properly and score the children accurately. It also takes a great number of tests, and they must first be standardized. In order to do that, we take some simple thing which requires mental alertness, with which all children have probably had a great deal of experience, such as tying a double bow-knot; or else we take something with which few children have ever had any experience, such as repeating a series of digits backward after hearing them repeated forward. We then try this out on a large number of children and make exact records of the performance of each child. Then the average performance of a large number of children on that test we call the norm or standard for that age.

"Of course, you understand, if one makes a low score on these tests, it does not prove that he is a 'dumb-head,' or that he can not succeed in life. Some very

capable men do make only moderate scores. The intelligence measured by these tests constitutes only a portion of the many factors which make for achievement in life. A child or adult with a moderate or even low score, who has great determination and industry, often succeeds better than a person with a high score who lacks these two other qualities. However, on the *positive* side, the tests do pick out high intelligence, and a person on whom nature has bestowed this gift is under great responsibility to make the most of his rich natural endowments.

“By the tests, we learn what an average child of any given age can do and ought to do. We thus have a basis for a comparison. A seven-year-old child, for instance, ought to tie a double bow-knot in one minute. If he can do this at age four, we say the child is three years ‘above age’ in this particular test. It is a good sign. Some children can’t do this until ten or twelve. A child of eight ought to count backward from twenty to one in forty seconds. If you show a child of six a picture with the nose or eyes or mouth missing, he ought to notice the omission.

“Many people would believe it impossible that such simple little tests as these could indicate a child’s inherent mental power; but experiments extending now into the millions prove that they do. For instance, we find that it takes more of the thing we call intelligence to repeat numbers backward than it does forward. An average child of seven will repeat five digits forward and a child of ten will repeat six. But if we *reverse* the order, an average seven-year-old child can repeat only three backward, a ten-year-old four, a twelve-year-old five and an average adult six. It is interesting to see how many of your friends can repeat six digits backward after hearing them stated forward once. If they can repeat seven or eight, it would be

one indication that you have fairly intelligent friends.

“The Stanford-Binet scale is not entirely reliable above mental age fourteen, and must be supplemented by other mental measuring scales. But the average mental age of people generally is probably not much above fourteen years, possibly even as low as thirteen and a half years. This point is in dispute. But a good test of a superior adult mind is the following problem which should be solved in five minutes. Try it on some of your friends.

“ ‘A mother sent her boy to the river to get seven pints of water. She gave him a three-pint vessel and a five-pint vessel.

“ ‘Show me how the boy can measure out exactly seven pints without guessing at the amount. Begin by filling the five-pint vessel.’

“When testing a child, the tester must get him in a pleasant eager mood, and should have him in a quiet room with no one else present. The directions must be given in a pleasant even tone and always *exactly the same way*. The precise words for giving the tests, and also the tests and methods, are described in great detail in my book, *The Measurement of Intelligence*.

“Here is a good test of common sense for a ten-year-old. Say to the child: ‘I am going to read a sentence with something foolish in it, some nonsense. I want you to listen carefully and tell me what is foolish about it.’ Then read the sentence rather slowly, in a matter-of-fact voice, saying, ‘What is foolish about that?’ Here is a sample:

“ ‘A man said, “I know a road from my house to the city, which is down-hill all the way to the city and down-hill all the way home.” ’

“A bright child will at once smile and point out the absurdity. The detection of absurdities is one of the most serviceable tests of the entire scale, and comes nearer than any other to being a test of that species of mother-wit that we call common sense.

“Another fine indication of a person’s intelligence is the way he notices similarities and contrasts. Children usually notice how things are unlike, before they notice points in which they are alike. For example:

“ ‘What is the difference between a fly and a butterfly?’

“If the child points out important differences it is a sign of brightness. Good replies to the above question are: ‘Butterfly has bigger wings.’ Unsatisfactory replies are: ‘Butterfly makes butter.’ ‘Butterfly has no feet and fly has.’ However, the average child has reached the twelve-year mental level before he will point out fundamental likenesses in the following test. Say to the child: ‘In what way are a snake, a cow and a sparrow alike?’ Satisfactory replies are, ‘All can move around,’ ‘All breathe air,’ etc.

“These tests may seem trivial, but the greatest inventions and discoveries are largely due to the ability to note differences and resemblances that have escaped other men. Millions of people had seen apples fall to the ground, but Sir Isaac Newton’s mind questioned *why* they fall down, and this, so tradition tells us, led to his discovery of the law of gravitation. The ability to perceive relations, similarities and differences is a useful measure of the higher mental processes of any individual.

“Still another fine test is to discover what a child sees in pictures. We have several pictures that have been tried out on millions of children. We thus know

what a child ought to see in them and say about them at a given age. One of these pictures is entitled *A Dutch Home*, showing a family scene; another is a picture of an Indian and some white people paddling a canoe; a third is a picture of a number of people gathered about a man in front of a post-office reading some interesting piece of news from a newspaper. A child of three ought to *name* three objects, but a child of seven ought to *describe* as well as name quite a number of objects in each picture. By the age of twelve the average child gives genuine *interpretation* of what each picture means. In this way we arrive at a fair measure of some of a child's fundamental powers of observation.

"However, the best single test of any person's intelligence that we have so far devised is the number of words of his mother-tongue that he can clearly define.* You can estimate a person's general intelligence pretty closely by giving him a vocabulary test, and it will not take more than ten minutes. The reason that this is such a good test is that everybody hears his mother-tongue from babyhood. Of course, in some homes he has a chance to hear more words than in others. Yet a child goes about so freely nowadays and hears so many people speaking and sees so many advertisements and the like, that his mental alertness is to a high degree indicated by the number of words that he learns to know and use. Some exceptions occur, but this is better than any other three tests combined.

"If you are testing a child's vocabulary, he should be encouraged frequently by saying, 'That's fine. You

*The Stanford-Binet tests can be secured through Houghton, Mifflin Company, Boston, but it is far better for parents not to try to give these tests to their children but to have this done by the experts who are now using such tests to grade the pupils in nearly all schools throughout the United States and Canada. However, Professor Terman's book, *The Measurement of Intelligence*, published by Houghton, Mifflin Company, is one of the very best books ever written for giving parents an understanding of their children.

are doing beautifully. You know lots of words.' Never tell the child his definition is not correct, and avoid saying anything that would give a lead as to meaning.

"Of course no one test will measure a person's intelligence. We use six tests for each age level, allowing two months of 'mental age' for each test he passes over and above those designed for his physical age. For instance, if a child passes all the eight-year tests and three in year nine and one in year ten, its age level is eight years and eight months, and so on. It is usually necessary to give thirty or more tests to each child.

This gives you only a very meager idea of the numerous complicated steps in devising intelligence tests and determining just what it is in the human mind that the tests measure. But it seems thoroughly demonstrated that these simple devices do measure with considerable reliability the things we call 'general intelligence.' They give us suggestions and indications, also, of a child's moral and social traits; but special batteries of tests have now been devised, particularly by Dr. Paul F. Voelker, president of Battle Creek College, and by Doctors Cady and Raubenheimer of Stanford University, by which morality and character can be measured almost as reliably as we could measure general intelligence a dozen years ago.*

"We used the character tests on the gifted children after selecting them by intelligence tests, and on special control groups for comparison. The question to be investigated here was this: 'Is the bright boy more likely to be a bad boy than the average? Is the brilliant girl the one that is most likely to go wrong? The

*For further tests of honesty that have been developed and standardized since Professor Terman gave the foregoing tests to his brilliant children, the reader is referred to Chapter XVI, where the tests used by Doctors Hartshorne and May are described.

popular impression has always been that many geniuses have been immoral; that the keen, intelligent and gifted are also more likely to be the ones who are lacking in moral sense and sound ideas of rectitude.

“Very happily our whole research proved quite the contrary. Let us take one simple test for example. This test was designed to measure the tendency of the child to pretend to know things that he did not know—a fairly prevalent form of dishonesty. It is a good test to try on your friends or children. We first asked the child a long series of such questions as these:

1. Do you know who discovered America?
2. Do you know who wrote *Huckleberry Finn*?
3. Do you know who was the prophet who spent the night in the lions’ den?
4. Do you know what the receiving wires of a wireless are called?

“Now, later on, without warning, we tested their *actual* information on these same questions. The child was given practically the same questions with a number of answers attached, and asked to mark which answer was correct. These statements merely *reversed* the questions already given, but the child *had to know* the correct answer. The following are examples:

1. America was discovered by Drake, Columbus, Balboa, Cook.
2. *Huckleberry Finn* was written by Alger, Dickens, Henty, Mark Twain.
3. The prophet who spent the night in the lions’ den was Daniel, Jonah, David, Joel.
4. The receiving wires of a wireless are called amplifiers, detectors, reflectors, antennæ.

"Now, if the child had faked on many of the first set of questions, the second was almost sure to catch him. His chances for guessing correctly each time are nearly nil. Thus, we got some sure indications of his honesty.

"The complete battery of tests was given to 532 children of the main gifted group and to 533 unselected or average children of a control group. A comparison of the scores of the gifted and the control groups showed a significant moral superiority of the gifted group for both sexes and at all ages. Incidentally, the girls in both the gifted and the control groups ranked higher than the boys in these morality tests, with the single exception of the test for honesty. In the honesty test, however, the boys of both groups made a better showing than the girls.

"One interesting fact revealed by these tests is that both the gifted boys and the average boys get worse between twelve and thirteen. They actually fall back in moral development. This proves that boys of about that age have rather a hard time to go through. It is a time when they especially need sympathy and understanding on the part of both their parents and teachers. But girls, it turned out, have no such drop in their character development. They just keep getting better and better all the time. This is a very happy showing.

The total outcome of these moral tests should be encouraging to the fathers and mothers of unusually bright children. It shows that parents do not need to be alarmed for fear their bright boy or girl is more likely to go wrong than their less gifted ones. Indeed, the investigation proved that, as a rule, *the gifted child has reached the stage of character development at nine which the average unselected child does not reach until about fourteen.* Certainly a happy finding when we

reflect that these gifted children will probably furnish a great many of our future leaders."

At this point I asked Professor Terman if he did not find that a great many children who were prodigies in some special direction such as music, drawing, mechanical genius and the like, were very ordinary or below average in other directions. "You know," I said, "that it is almost a universal belief that musical, artistic, poetic and inventive geniuses are likely to be freaks and lacking in what we call 'common horse sense.'"

"No," replied Professor Terman, "the conviction I gained was the opposite. We found no basis for the theory that nature makes a man weak in one direction because she has made him strong in some other. I confess that I came out of this research with a much higher opinion of the real intelligence of musicians, artists, poets and the like, than is usually held. Even if they do not have very wide general education, they have to have pretty wide general *intelligence* to do real creative work.

"Without a background and foundation of general intelligence, the mediocre or dull boy with unusual mechanical ability is likely to become just a good tinker. True, he is rather a handy tinker, but not a real mechanical genius. And the mediocre person who has the local reputation that he can 'just draw anything' is more than likely to become a third-rate cartoonist or a sign painter.

"Such persons lack big ideas. We ran down twenty-six so-called 'prodigies' in music and drawing where each child had only average *general intelligence* or below, and in every case we became convinced they were merely clever copyists.

"Take a case such as Blind Tom, the musical negro, who was a moron. He was advertised as a wonderful

musician. But he had merely wonderful facility in *re-producing* melodies he had heard; he had no creative musical ability whatever. I think great art requires great intelligence."

"You believe then," I said, "that these mental tests are of real value in discovering the general intelligence and the special abilities of children, and enable you to predict what they do and what they are really made of better than can parents or teachers."

"Yes," was the reply; "they are a very great aid to our personal judgment. In my *Measurement of Intelligence* I relate numerous cases where the tests have proved their validity and reliability.

"One good instance of the value of mental tests in picking out genius is that of Henry Cowell. When I ran on to him, some fifteen years ago, he was a boy of about twelve. He had never gone to school, and was living out near here in the country, where he was weeding people's lawns and acting as janitor in the little local school. He had read text-books in botany, and even at that age, without any schooling, he probably knew more about California wild flowers than any botanist in his district. He was debating whether to become a musician or a plant breeder.

"The boy was whistling all the time and improvising music, although ignorant of the laws of harmony. He was supporting his mother and himself on about fifteen dollars a month, and out of that he managed to buy a piano on the installment plan. I tested Henry, and found his intelligence rating about 140. His mother was an able woman who had written two novels.

"I told Professor Seward here in the university about him, and he said, 'If he is that kind of boy, he ought to have his chance.' So the credit for starting Henry belongs to Professor Seward and not to me. He

interested a number of people, and Henry was thus given a musical education. To-day he is a musical composer of note, although, I believe, his compositions and methods of piano playing have been subjects of much debate among musical critics. But no one doubts that he possesses great musical talent or that he also possesses high intelligence.

"Here was a case where our mental tests pointed to a boy's real talent, and gave a true genius a chance.

"Not only the exceptional child, but every child should be mentally tested, I think, and all the aids of modern psychology placed at the service of the child and his parents, to enable him to make the most of himself in the world."*

*Every town and school library in America should possess the two volumes containing these studies of genius. They are entitled *Genetic Studies of Genius* and are published by the Stanford University Press, Palo Alto, California, at a price of five dollars per volume. The first volume deals with Professor Terman's gifted children, and the second takes up the work on the childhood of great geniuses done by Dr. Catharine M. Cox, (now Mrs. Walter Miles), which is described in the interview with her in Chapter XII. Many parents who have some education along lines of psychology and child training, will find that the volumes contain a mine of information and are fascinating to read. A great part of the volumes is non-technical and easy to read. The books can be purchased through any book store.

CHAPTER XI

THE PSYCHOLOGIST LOOKS AT THE BRIGHT CHILD

XI

IN THE previous chapter Professor Terman told us the general plan and purpose of his research upon gifted children. He also described the methods by which they were selected and some of the general facts about them that show how they differ from average children. In the remainder of the interview he is going to tell us more about their physical, mental, temperamental and social characteristics, and give particularly some suggestions to parents and teachers for the treatment and teaching of exceptionally bright children.

Perhaps the most amazing fact that this and other researches have recently revealed about our public schools is that the really backward child in our school system is not the dull child but the bright child. Bright children are, as a rule, farther behind the grade where they ought to be than are average or backward, or even stupid children. As Prof. Edward M. East, of Harvard, has brought out in his admirable new book, *Heredity and Human Affairs*, we probably expend about one thousand dollars a letter in teaching feeble-minded children the sentence, "I see a cat." It may be worth the money and effort, but the tragedy is that we have spent perhaps less than one dollar per child in discovering the characteristics of brilliant children and in learning the best methods of guiding and teaching them. With these general thoughts in mind I asked Professor Terman at this point of our talk to give me some suggestions that parents and teachers could carry out in the training of exceptionally bright children.

"First of all," I said to him, "I wish you would answer the question that is constantly asked by parents: 'Shall I push my bright child ahead, or hold him back?' It is a knotty problem. What is your answer to it?"

"Well," replied Professor Terman, "I think 'prodigy-making' or 'child-pushing' is a sorry business. But if you ask the question in this way: 'Should I allow my child to work all the time he wants to up to his best level?' my answer is, 'Yes,'—provided you give him plenty of time for other things, such as play and companionship. But during work hours he ought to *work*."

"His mind is going to be active anyway, and if he does not have useful and interesting work, he will be occupied with trivialities. He will likely sit and dream. Carried to excess, this is a bad thing. Bright children who are not kept busy, day-dream harmfully under their lessons. Sometimes the teacher will not let them study something else during school hours, or take up interesting supplementary reading, so they sit there, and sit, and their minds wander. This is likely to be very harmful."

"You believe, then, that a child should be allowed all the good reading he desires, provided he is healthy and plays sufficiently?"

"Certainly; why not? If a child of twelve can read Shakespeare with a better understanding than the average college senior, why shouldn't he be allowed to do it? He ought to be encouraged."

"In fact, there is hardly anything in which parents are more interested and in which they should be more interested than the books which their children read. A great deal of a child's character development is no doubt influenced by the books and things he reads."

On this point, we supplied over six hundred of our children with little record booklets, and also supplied them to about the same number of unselected children. The children recorded what they read each week for a period of two months and wrote down their comments upon each book.

"The reading records show that the average gifted child of seven years reads more books in two months than the average unselected child reads at any age up to fifteen. The gifted child of eight or nine reads three times as much as the average child of that age. The children of thirteen still read about twice as much. The reading of the gifted children also covers a much wider range and includes far more non-fiction and information reading. On the whole, the most striking contrast is less in the type of books read than in the age at which they are read. A book that is well liked by an average child of eleven or twelve is often read with enjoyment by the gifted child of eight or nine. Parents ought to know that the quality, quantity and range of their child's reading is a very strong indication of his general intelligence. A child's reading should be watched with great care by his parents."

There was one question that I had all along been eager to ask the professor, and that was about the supposed lopsidedness of brilliant people and geniuses. So, at this point I said, "One of the great things that the public wants to know about gifted children is, are they not one-sided and lopsided? Or is not their superiority due to the fact that they merely have highly specialized abilities in some particular line? That is, is not the poet merely a born poet and nothing else? Is not the musician or the mechanic or the inventor just born for these particular things and not much use for anything else?"

"Those questions are extremely important, and I have already touched upon them, but their importance warrants submitting further evidence," replied Professor Terman. "You want to know, are gifted children more specialized than other children in their abilities? Are they one-sided in their development or do their abilities run long on a uniformly higher level? When one ability is highly developed, is this development at the expense of other abilities? If a child is strong in arithmetic, is he likely to be weak in language? Or, if he is strong in science, is he not weak in music, language or mechanics?"

"One of the most encouraging things of the entire study was our absolute proof that there is not a particle of evidence that the intellectually gifted are any more one-sided than ordinary people. The way to prove this is to plot out a profile showing the aptitudes of a group of gifted children, and those of a group of ordinary children. By a profile we mean a diagram that shows the ups and downs, the high points and low points of a person's abilities. You can make a profile in the same way of one's interests or one's moral traits and the like.

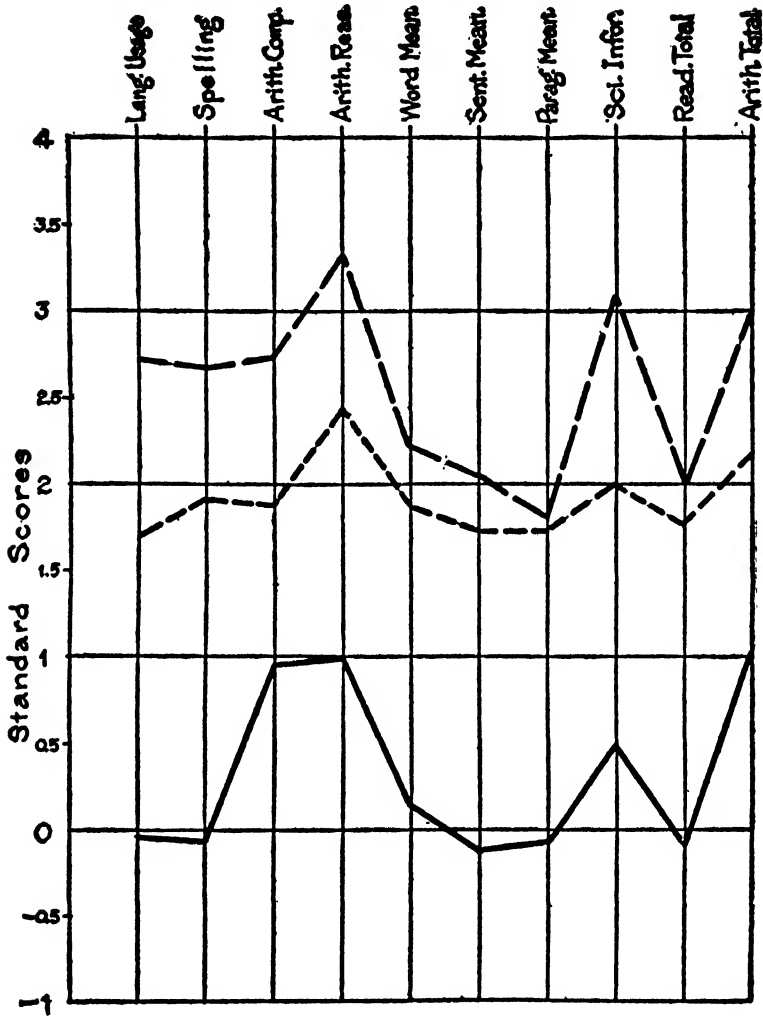
"We charted out the profiles of several groups who showed rather special abilities in some one direction. For example, we took a group of sixth-grade children, and a second group of twelve-year-old children from among our gifted youngsters who were extra good calculators. We then compared them with a group of twelve-year-old average children who were also extra good as calculators. It seems to me it would be very interesting to parents and teachers if you would print the diagram that shows the results. (See chart on page 244.)

"You see, all three groups ranked high in arithmetic,

but the interesting thing is that the other parts of the three profiles also run nearly parallel. There is no more unevenness in the abilities of the gifted children than there is in abilities of the ordinary children. The profiles of the gifted children merely run on a higher level. The gifted children," said Professor Terman, running his finger over the diagram, "are away up here with their abilities wavering up and down, and the average children are down here with their abilities wavering up and down just about the same. You see, every man doubtless has special gifts that are above his average abilities.

"The encouraging thing about this to me is that, while extraordinary children are extraordinary, ordinary children are also extraordinary. From now on parents, teachers, employers and society in general should regard every child as a unique individual with specific mental mechanisms that are the peculiar personal possessions of this particular child. These special mental mechanisms are the basis of all the child can do and become; and the duty of the parent, teacher, employer and vocational adviser is to find out each child's special abilities and see that he works up to their highest levels. As I have already pointed out, we found that the level of the abilities of our gifted children was, as a rule, considerably higher than their accomplishment level. And this is probably true of every man and woman in the world. Probably none of us does so well as he could, nor becomes so great a person as he should become. The object of vocational guidance, and indeed of all education, is to *make every child's accomplishment level run parallel with the level of his abilities.*

"I should like to emphasize that, whether it is a group of gifted children you are talking about, or a



The above chart is Figure 13 from *Genetic Studies of Genius*, Vol. I., reprinted by permission of Stanford University Press. At the top are the various subjects in which three groups of children were ranked, all three groups having been found to be unusually high in arithmetical reasoning, consequently "good calculators". The upper line shows the standing in each subject of a group of sixth-grade gifted children, the middle line a group of gifted children, all twelve years old, without reference to grade, and the lower line a group of average twelve-year-old children without reference to grade. The gifted children are seen to be no more lopsided than ordinary children. The profiles all run along with about the same ups and downs.

group of unselected children, you are going to find appreciable special abilities in both groups. You will find a considerable portion of both children and adults who are clearly much higher in one thing than in other things. But there is no evidence that this is any more true of geniuses than of common folks. These special abilities do exist to a degree, at least, in an enormous number of people; and they should be taken into very careful consideration both in vocational guidance and general education.

"As one illustration of the fact that high ability in one direction does not indicate weakness in another, I might cite the case of a high-school student here, a girl who writes very beautiful poems. She is now in her senior year in high school and she makes *A*'s right along in mathematics just about as easily as she does in literature.

"I might cite two or three other cases. Here is a boy whose father and mother were both on the legitimate stage and in the movies. The boy had starred in a well-known movie and was not at all spoiled by the experience. He is gifted as an actor, yet he makes excellent school grades. Nearly a dozen of our children have appeared in movies. One of our girls has doubled for a famous movie actress and appeared in a number of pictures. She is a beautiful girl, but absolutely sweet and unspoiled. I wish I could go on and tell you a great many of the remarkable special achievements of these children, but the point right here is that they are not one-sided and do not have merely 'one-trolley minds.'

"Of course, you do find that a great many of them are especially gifted, say in literature or mathematics or mechanics, or in general science; but this is just as true of average children, except that their gifts are

not so great. But you can safely say to parents that if a child stands high in literature, he is much more likely to stand high in mathematics than one who stands low in literature and vice versa. In fact, the old 'compensation' theory of Emerson and others, that nature makes a man weak in one direction just because she has made him strong in some other direction, is completely disproved by our investigation, as well as by modern psychology in general."

"But what *are* we going to do with gifted children?" I persisted. "Shall we jump the child three or four grades, where, because of difference in age, he would be socially out of place, or should we provide a special school for him, or should we put him in a special room?"

"Of course the special opportunity room is, as a rule, I think, the best solution. You saw Miss Lulu Stedman's room of gifted children at Los Angeles. Some of our children are with her. They are all happy together, and are doing work three or four years ahead of grade, without the slightest pressure. Certainly for these children that has been a fine solution, and I think it should be extensively copied.

"But where a special opportunity room can not be provided, I think we can not set up any definite rule that will apply to *every* child. We must decide upon the merits of each individual case. Sometimes I advise the parents and teachers to let the child go ahead as rapidly as he can; but in other cases, I urge them not to do it. It is owing to how *dependable* the child is.

"As an example, I once knew a girl who, at the age of thirteen and a half years, was a high-school senior, president of her class, and one of the most popular girls in the high school. This is a case where it certainly paid to let the child go on. Everybody accepted

her, and she was a leader. But sometimes you will find a girl just as bright, who really ought not to be promoted so rapidly, because she has not quite the qualities of social adaptability and leadership which were possessed by the first girl I mentioned.

"In cases where bright children are more or less markedly lacking in social adaptability, I urge the parents not to let them go too far ahead of their years in school. Sometimes I advise them to take the children out of school for a half-year, but in such cases I insist that the child shall have plenty to do, and also that he shall spend several hours a day with other children. The child must have something worth while to do.

"Where it can be done, however, without getting the child socially unadjusted, and where the child has good health, it is highly advisable to let him go as fast as he likes.

"Some years ago, for instance, I tested a boy of seven, and found his mental age was ten and a half. He had never been to school, so when he went the teacher tried him out in the first grade. As it happened, however, she had taken a course in how to treat gifted children, and she always had her eyes open for them. After recess she promoted this youngster to the second grade, and after lunch she promoted him to the third grade, and before he went home that night she had promoted him to the fourth grade. Many a boy equally bright would have been required to take at least two whole years to cover the ground that that boy was allowed to pass over in one day.

"Now the question is, did it do him any harm? Well, here is your answer: He entered high school at eleven; he entered college at fourteen; he has been in college now over three years, and practically all of his grades have been A. He has made such an extra-

ordinary record that our honor fraternity, the Phi Beta Kappa, has recommended him for election a year before graduation—a most unusual honor. The boy is happy, well adjusted with his comrades, and in perfect health.

“Of course we can not guarantee that a precocious child will not become unbalanced—even psychopathic. That has happened with one or two of the much-advertised college prodigies. But brilliant children are far less likely to do this than stupid children, although the popular impression is that the stupid, slow, dull or even average child is the one that remains steady and balanced and can be depended upon. This belief is entirely false, and when it comes to adult life, more morons and stupid people go insane than ordinary or brilliant people.

“We find no basis in our investigation for the popular notion that genius is linked with nervous instability or insanity. Parents with precocious children can rest assured that, on the average, they are less likely to become nervous wrecks than are slow and dull children, or even average children.”

“Is it not true, however,” I asked, “that precocious children do have a lot of oddities and eccentricities which prevent them from doing good team work, being one of the gang, and making friends like ordinary children?”

“The thing that gives rise to this notion, I think,” answered Professor Terman, “is the fact that a child of ten, for instance, with the mental capacities and knowledge of a child of fourteen or fifteen, has a natural desire to associate with children not of his physical age of ten, but with those of his mental age of fourteen or fifteen. If the child is a boy, he is smaller physically, but he is just as big mentally. So the poor

little chap has a hard time, both going and coming. Nearly anything he does is out of the ordinary for children of his age, and that is probably the reason that he has gained such a reputation for being odd, peculiar eccentric and lacking in social qualities.

"You must remember that there is no tyranny greater than the tyranny which children exercise over one another in their social relations. You know how chickens pick on the black one, or on one from another flock thrown into their pen. And that is the way children do. A child comes along who is a little different from the rest of them, and they all pick on him. Then, if his vocabulary is more cultivated, or if his clothes are different, the tendency is to make fun of him. That is a perfectly natural thing, and you can not blame the children. They ought to be trained not to do it, of course.

"You can see, therefore, that a child of ten who does manage to get along at all with children of fourteen or fifteen is endowed with much greater social qualities than they have. He has a big handicap, and it takes a lot of social capacity on his part to overcome the difference. These are the things which parents and teachers must consider when it comes to deciding whether they shall jump a child two or three years ahead in school or hold him back a little. I feel that a child should not be jumped beyond the limit to where he is made unhappy by the bigger and older children and is not able to hold his own.

"Bright children improve right along through high school in social qualities. Their very intelligence enables them to catch on as they grow older. They get their physical growth also and the difference isn't so striking. By the time a brilliant boy gets into college and is pretty well grown, he probably forgets age

differences, and his comrades no longer notice them. Of course if he enters college at thirteen or fourteen, he has quite a problem for the next four years.

"The typical college freshman, who is usually about eighteen, has nothing but contempt for the fourteen-year-old prodigy who comes into the class. But out in life, ten or twenty years later, we do not ask whether the 'prodigy' was old enough to play as good football as the other fellows, or to compete in any other kind of athletics, or to do his part in the freshman-sophomore scrap. All we ask is whether *he can deliver the goods*.

"To-day, for instance, everybody would see the absurdity of looking with contempt on former Secretary of State Charles E. Hughes just because he was a 'child prodigy.' Mr. Hughes, who was the favorite pupil of one of our professors now here in Stanford, was graduated from college at about the age the average student enters. I imagine that he had some tough problems in getting along with his older comrades. But everybody forgets that now because he has eminently delivered the goods.

"Some of the outstanding things that parents should look for in their children that indicate high intelligence or specialized ability," continued Professor Terman, "are the following, taken from the parents' own reports of the things they had especially noticed in these gifted children:

Desire for knowledge
Retentive memory
Understanding new ideas quickly
Rapid progress at school
Great range of general information
Early speech
Asking intelligent questions
Accomplishing difficult things

Keen observation
 Unusual vocabulary
 Great lover of nature
 Great interest in animals
 Good ear for music
 Quick with figures
 Building mechanical things
 Repairing things
 Knows the makes of all cars
 Reading about mechanics
 Liking to copy pictures
 Expressive reading
 Reciting stories
 Interpretive dancing
 Unusual skill in making dolls' clothes (girls)

"The most marked thing, of course, is their insatiable curiosity—their passion to learn. The amount of general information upon almost every conceivable subject which these bright children of ours have picked up is not only gratifying but also truly astonishing, and this holds true whether they have attended school or not. Indeed, their minds range so far beyond the mere school subjects that some of them are like little walking encyclopedias.

"In order to find out how much general information bright children have, as compared with average children, we organized what is known as the Stanford Information Test, of over six hundred questions, covering an enormous range of items. Any child or adult, in order to pass this test, would have to have a great range of knowledge.

"Following are a few samples of these questions. (The way to answer them is to underscore the right words):

1. The house fly spreads bubonic plague, typhoid, yellow fever.

2. The ligaments are attached to the bones, intestines, stomach.
3. Cumulus refers to clouds, electricity, erosion.
4. Water enters the roots of plants by capillary attraction, osmosis, solution.
5. The shepherd boy who became king was David, Saul, Solomon.
6. Roger Williams was a colonizer, judge, merchant.
7. The power of declaring war is vested in Congress, President, Secretary of War.
8. "The Invincible Armada" belonged to France, Rome, Spain.
9. The law of gravitation was first stated by Copernicus, Galileo, Newton.
10. R. S. V. P. means Collect on Delivery, Informal, Reply Expected.
11. Handel is known as a musical composer, organist, violinist.
12. Rodin is famous as an architect, a painter, a sculptor.

"When you extend this list of questions to over six hundred, I think you will agree that a child of eight or ten, or even an adult of forty, must have had a pretty active mind and a lot of curiosity in order to have his head full of correct answers.

"The questions were divided into two groups, A and B, and in order to answer even the questions contained in Group B a person would have to have information concerning such diverse things as soap, planes, the burro, tadpoles, peat, cloths ivory, the largest state in the Union, soda, 3.1416, dynamos, the tides, 'plant breathing,' insulating materials, pollination, Black Beauty, Cinderella's coach, Hiawatha, Huckleberry Finn's chum, adjectives, Sir Launfal, gnomes, Vulcan, the author of *The Raven*, the prefix *inter*, the *Jungle Book*, Milton, Columbus, Colonial settlers, Mo-

hammered, trial by jury, the Red Cross, the Pope, the allies of Germany, the feudal system, Federal authority, the Soviet, Horace Mann, Pericles, movie stars, musical notation, mixing paints, jazz, Beethoven, social reform, stucco, sculpture, architecture, operas, etc.

"In this long battery of tests the superiority of the gifted children over the average was very great. It is a splendid test, which parents and teachers could easily use in the discovery and identification of gifted children.

"One test of the intelligence of their children which parents have always greatly relied upon has been their promotions in school. But this varies so, from many causes, that it is not an accurate measure of a child's real mental powers. You must not suppose that all gifted children are satisfactory pupils. A large majority are; but sometimes they lack ambition and sometimes they have no interest in the work because it is too easy for them.

"The Stanford Achievement Test, already described, was used in order to measure, not the child's school promotion, but his actual mastery of the school subjects. The results were truly amazing.

"What we found was this: The average gifted child of seven has skipped one year and at fourteen has skipped two. But these tests proved that the average gifted child, say, of eight, has actually mastered the school work of the ten-year-olds, and the gifted child of twelve has mastered the work of the fifteen-year-olds. They are thus held back two or three whole years below where they have mastered the school subjects. It is not that they might do the work, but that they *have already done it!*"

"One of the very important parts of the research was to discover the social and other interests of these children and compare them with those of average chil-

dren. Of course we do not depend either on general theory, or our own judgments or that of parents and teachers in estimating the character and degree to which children are interested in various things. One of our graduate students, Mrs. Jennie Benson Wyman, worked more than two years under the direction of the very able statistician, Dr. Truman Kelly, who has been all along our general statistical adviser, in developing a large battery of what are known as 'free association tests' for the purpose of measuring their interests and enthusiasms.

"The method consists in giving the person a stimulus word and having him name instantly the first word or thing which this stimulus word calls up in his mind. For instance, if I say the word 'school,' one child might say 'Shakespeare' or 'arithmetic,' while others might say 'baseball' or 'dancing,' and the like.

"The response to one stimulus word would not mean much. But a list of a hundred or more carefully selected and scientifically scored words gives us a profound insight into one's interests and character.

"Of course you might imagine that if you used this test on a person to-day and then again in six months or a year there would be no correspondence in the results of the two tests. You might imagine that if I said the word 'diamond' to you now what you would reply would be largely a matter of accident, and that if I gave you the same word next week or next year, when you happened to be in a different mood, you would make an entirely different reply. You might in responding to just one word, but your responses to a whole list of words will be amazingly similar. Mrs. Wyman tested one group of children twice, with an interval of an entire year in between, and the agreement between the two sets of responses was astonishingly close.

"I think, in fact, that here is an instrument that has, in skilled hands, very great possibilities for burrowing into the inner recesses of the human mind. It is an old test in a way, but I believe we are going to find new uses for it as we improve its technique and our skill in interpreting the results. I think there are a lot of applications of the free association tests which we shall shortly work out. I do not mind telling you, indeed, that we are now at work here at Stanford on a number of lines of research in this field. One of my students, Dr. Herbert Laslett, has been able to make a pretty clear separation between healthy-minded boys and delinquent-minded boys by giving them this test. I think it would be of great aid in finding the potentially bad boy before he becomes bad and thus enable us to give him special help and training in time. We would be getting at the very root of criminalistic tendencies and potentialities before they develop into habit.

"Another application that I think will be feasible is the measurement of masculinity and femininity in men and women. The fact is that while novelists and many other writers discuss very glibly the differences between men and women, down at bottom, we know very little about them.

"We are just starting a research on that problem now. I have a list of words made up ready to be tried out and standardized for that purpose. You can just sit down and think of any number of words to which the responses of boys and girls, or men and women, would likely be different. For instance, you know very well in advance that you will get more replies from women and girls that have some reference to weddings, if you use the word 'bell,' than you will get from boys and men. If you say 'bell' as your stimulus word, girls will likely reply, 'roses,' 'wedding,' 'June,'

'bride' and the like; boys will be more likely to say 'fire,' 'school' or something like that.

"But if a boy said 'roses' or 'wedding' in response to the word 'bell,' it might indicate that he was somewhat effeminate; whereas, if a girl said 'fire,' or some similar response, it might indicate that she was a tom-boy. Of course, one word would not amount to much, but three or four hundred would tell us a great deal about masculinity and femininity, and about the different interests of men and women.

"I think perhaps we shall be able to find out whether the girl who is reared with a lot of boys—brothers and no sisters—is made masculine, and whether a boy who is reared alone by his widowed mother or aunt is made effeminate. We hope to find out whether women teachers make the boys effeminate, and whether a contrast in masculinity and femininity makes for or mars married happiness. You could by this method compare divorced couples with happily married couples and no doubt find out a lot of things as to what causes married happiness and unhappiness. Every man on the street has very definite theories as to what women's minds are like, and how the feminine mind differs from the masculine mind. The novelists, as I have said, can offhand tell us all about it, but as a matter of fact they don't know a thing about it. We simply do not know whether anything the novelists, poets and philosophers have told us about the nature of the feminine mind is true or not; and we shall never know until we get the facts by exact experimental methods.*

"By these free association tests we were able to discover pretty definitely the things in which the children

*Since this interview was written in December, 1925, Professor Terman and his students have carried this proposed investigation to a very advanced stage and have secured many of the results that were here predicted. It is hoped that before many months these results can be published.

were most interested. The next step was to find out whether their interest in a subject enabled them to succeed better at it. We found that it did, and I think that is a highly important thing for parents and teachers to know. The children were carried forward by enthusiasm. Enthusiasm and interest thus are seen to be very definite factors in success. No doubt many failures come, not from lack of ability, but from lack of enthusiasm, belief, interest and hope. No matter how great a man's intelligence may be, he has to be interested in a thing to succeed at it in a great way. True, some of these children with only a moderate interest in a subject did succeed pretty well, but they were children who had extraordinary intelligence.

"This brings us to the question: Must a person be interested in what he is doing in order to achieve success in it, or is it the ability to achieve success in it that makes him interested? The answer to that is: A person must be interested to achieve any marked success. The greater the interest and enthusiasm that you can throw into your work the better you will succeed. Even with their high intelligence, some of our children were not making stars of themselves in school because of lack of interest. There were numerous causes, of course, for this lack of interest. Some children were so far ahead of their grade in actual knowledge that the work in the grade they were in seemed trivial and uninteresting. But intelligence alone is not the whole thing in success. Moderate intelligence with high enthusiasm will often succeed where high intelligence with low enthusiasm fails. Enthusiasm alone may turn failure into success.

"The method of scoring these free association tests is too complicated to outline here, but, as one example of the results, they upset all popular beliefs about the insociability of precocious children. The precocious

child is usually pictured as being offish, hard to get along with and generally unsociable. We found that these young geniuses had the very greatest interest in parties, dancing, clubs and all sorts of social activities. In all these respects they were decidedly more sociable than the average children that we tested. This was further brought out by the fact that in school they had won far more than their proportionate share of class honors of the elective kind."

"Is it not true, however," I asked, "that a great many of these children, who seem so bright when you get them, have been pushed and crammed by their parents? A lot of people are preaching over this country that you can make geniuses out of nearly all children by properly stuffing and cramming them with knowledge when they are very young."

"That doctrine, on the whole, is pernicious, and facts do not bear it out," said Professor Terman. "Either a great many of the parents of 'prodigies' are unmitigated liars, or else there has been very little of the cramming process attempted with their children. I know many of the parents intimately, and when they tell me, in heart-to-heart talks, that they have not especially pushed their children or made efforts to stuff their heads full of information, I am bound to believe them.

"I have found that most of the parents of those in our groups took the sensible course and tried to answer the child's questions, or gave him books in which he could find his own answers. Heretofore, at least, the genius has been largely self-taught. One of the great hopes of modern psychology, and of our investigation in particular, is that we may find methods for teaching genius better than it can teach itself. But one is astounded over and over again at the amazing things precocious children will teach themselves. What chil-

dren learn without any teaching from their elders is a good sign for parents to watch.

"Some years ago, for instance, I tested a bright boy when he was six, and found his mental score high up in the gifted class. His mother, an intelligent but modest woman, had kept a large quantity of dated documents telling what this child did when he was almost a baby. As an illustration of how he taught himself, she showed me several large sheets of wrapping paper, three or four feet square, which were simply covered with Roman numerals from one up to four hundred. The child was about five years old when he pointed to some Roman numerals in a book, and said, 'Mama, what are those funny things? What do they mean?' She explained them as best she could, thinking of course that he would forget what she had said. Two or three days later she found these sheets, and on them he had written the Roman numerals from one to four hundred and they were all correct. This lad is now sixteen years old, and has been graduated from college with highest honors. He has exhibited no evidences of mental or physical breakdowns.

"Roughly speaking, seventy per cent. of the parents say that they have allowed their child to go his own pace in school; twenty per cent. have encouraged rapid progress; and ten per cent. have held the child back.

"The parents assured us, on their word of honor, that in a great many cases they had not even tried to teach the child to read. The youngster simply asked questions about what this word meant, or what that letter was, and before they knew it, the little one was reading. Of course these children learn to read, on the average, much earlier than children usually do.

"Nearly half of the gifted children we studied had learned to read before starting to school. About twenty per cent. learned to read before the age of five

years, and at least six per cent. before four years. A few had learned to read before they were three. One boy had even learned to read before the age of one and one-half, and another boy between one and one-half and two years of age. Four learned to read between two and two and one-half. Two of the latter were boys and two were girls.

"And right in line with the things these bright children teach themselves is another marked characteristic of gifted children, and that is their passion for hobbies. But with them they are purposeful hobbies—hobbies that mean something. The average child has hobbies, but he soon drops them. He does not build a rich and permanent interest around them. For instance, he does not collect as many stamps or as many butterflies, or he does not classify them as carefully. But the bright child holds on until he reaches his goal. He has more of the thing we call will power.

"Parents and teachers, within reasonable limits, ought to watch and encourage children's hobbies, when the hobbies are sensible and intelligent. They often teach themselves a great deal in this way. For instance, I knew a boy who started to build a wireless, and before he got through he had learned so much about electricity and physics that when he came to these subjects in high school and college he had nothing to learn. These hobbies are prime symptoms of genuine mental alertness and ability."

"I suppose you find teachers everywhere enthusiastic over their bright pupils," I said, "with their interesting hobbies, their amazing range of information, and mental quickness generally."

"I am sorry to say," replied Professor Terman, "that in many cases we found precisely the opposite tendency. Indeed, this was the most distressing part of the whole investigation. There is a fairly wide-

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spread prejudice among teachers (and even among *parents*) against the bright child, a tendency to squelch him. I have about concluded that the bright child is probably the most neglected child in the world, not only neglected, but often discouraged and 'sat upon.' As one educator has quite aptly put it, 'We have special classes for backward children and special schools for the feeble-minded, but God help the bright child!'

"I have known children who would not answer questions in class, when they knew the answers, because of their fear of being 'squelched' or of arousing prejudice.

"It is probably a part of this same prejudice which sometimes leads teachers and parents to discourage initiative, curiosity, and the passion to learn in bright eager children by insisting on extreme accuracy in little details, overlooking entirely the child's enthusiasm and real accomplishment.

"The president of a great university told me the story of his own career, which illustrates how children are often discouraged. Since he was planning to study medicine, and needed some work in physics, he went into the physics department, where the professor set him to doing a lot of laboratory work on the use of the balance. It just happened that he was thoroughly familiar with the use of the balance, and on the first day he wrote up the entire term's work. The next day the professor fired back his note-book all marked up because of slight mistakes in neatness, spelling, punctuation and the like. The student did the work over, and again the professor picked out all sorts of silly little faults.

" 'As a result,' the university president said, 'I became so disgusted with physics that I never took another course, and I was more or less handicapped all

through my professional life because I had not had more thorough grounding in that science.' "

"But didn't you find," I inquired of Professor Terman, "that on the physical side your young gifted children were likely to be in poor health and underdeveloped physically; and that their over-active minds really made nervous wrecks out of a good many of them? You know the popular belief is that precocious children are usually nervous, restless, unstable, frail and weakly, and that, as a rule, they practically all peter out or die young."

"I know that," laughed Professor Terman, "but, as I have said, we found nearly all general beliefs about gifted children upset by our investigations. One of my associates, Dr. Catharine M. Cox, (now Mrs. Walter Miles, see Chapter XII), is just finishing an investigation of the childhood of three hundred of the greatest geniuses that ever lived, and she finds no proof for the common theory of the physical frailty of persons of genius.

"In order to get absolutely exact data on these points we secured the services of Prof. Bird T. Baldwin,* of Iowa University, who knows more about the physical measurements of human beings, especially of children, than any other man that ever lived. He worked for months and made thirty-seven careful measurements on each of five hundred ninety-four of our children. He measured such things as height, sitting and standing; head, shoulders, arms, chest, hips, legs, breathing capacity, grip and weight. No such accurate information on precocious children has ever been collected before.

*Since this interview Professor Baldwin died in May, 1928, after a very brief illness—a great loss to child-welfare work throughout the world and to educational psychology, especially that of the pre-school child.

“We had already found from physicians and hospital records that these gifted children had weighed at birth three-fourths of a pound more than the average child weighs. This in itself would prophesy sound physical development. In most cases Professor Baldwin found this early prophecy fulfilled. Physically, these children are slightly above average children. Of course their physical superiority is not so great as their mental superiority; but you can be sure that precocious children usually are all-around healthy youngsters; indeed, from every standpoint they are likely to be all-around superior human beings.

“The groups of average school children *reported headaches twice as frequently as the gifted children*. Defective hearing was almost two and one-half times as frequent among the unselected groups as among the gifted children. The gifted children had slightly more eye trouble, probably due to using their eyes much more. The unselected children had symptoms of general weakness nearly thirty per cent. more than the gifted children. More than twice as many of the unselected children had poor nutrition as the gifted ones. All of the tests of metabolism and body chemistry made a better showing for the gifted group. Even in the matter of sleep, the gifted children showed an excess of nearly fifty minutes a day over the unselected, and reports indicated that as babies they slept slightly better than other children.

“Further evidence of the physical health and vigor of bright children is their interest in plays, games and sports. Perhaps the most wide-spread belief about precocious children is that they don't like sports and know very little about them.

“After a great deal of labor, we devised a battery of tests to measure the interest that these children had in plays and games as compared with average chil-

dren. We tested their knowledge of such items as these: spinning tops, riding bicycles, playing shinny, baseball, charades, the Chicago White Sox, the Brooklyn Nationals, the Superbas, Ty Cobb, Barney Oldfield, De Palma, Boy Scouts, Camp Fire Girls and nearly two hundred others of similar nature.

"The net result was this: that the average gifted child of nine knows as much about plays and sports, and has as much interest in them, as the average unselected child has at twelve. I can make that statement without the slightest fear that anybody will ever find anything very different. Practically all of our gifted children were interested in rough and vigorous games. They were also interested in games requiring mental alertness, such as checkers, chess and so on. We often even find them playing with the dictionary and with railroad time-tables figuring out long imaginary journeys.

"There is a slightly greater tendency for our gifted girls to be 'tomboys,' no doubt because of their sheer mental and physical vigor; but as for the boys we have found very few mollycoddles, or sissies, or mama's boys among the hundreds in our gifted group.

"There is one good sign which parents would do well to watch in their boys and girls, because it indicates both mental and physical health and alertness, and that is: Do they like to tackle hard jobs or easy ones, hard school subjects or easy school subjects?

"In order to measure our gifted children in this respect we took forty-eight school subjects, and had thirty highly competent persons, mostly graduate students and professors here at Stanford, give their judgments as to the amount of intelligence which they thought was required to master each subject. By combining all these expert judgments, we got a pretty reliable scale as to the intellectual demands of each

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subject as it is commonly taught in the schools. Following is the complete list of subjects, arranged in the order of their difficulty and of the amount of intelligence they require for mastery:

Physics	Grammar
Chemistry	Agriculture
Trigonometry	Dramatics
Latin	Instrumental music
Zoology	Geography
Biology	Nature study
Geometry	Reading
German	Bookkeeping
Algebra	Mechanical drawing
Botany	Painting
Debating	Vocal music
Composition	Modeling
Journalism	Manual training
French	Sewing
Ancient history	Cooking
Literature	Military training
English history	Freehand drawing
Spanish	Spelling
General science	Shop work, tools, etc.
Physical geography	Typewriting
U. S. History	Games and sports
Physiology, hygiene	Physical training
Civics	Folk dancing
Arithmetic	Penmanship

“We found that our gifted children preferred the *hard* subjects. Among the best liked subjects were debating, chemistry, physics, dramatics. Mathematics was the best liked of all—the very subject which the majority of average children despise. The subjects which the gifted children liked least were penmanship, sewing and folk dancing. If your child likes debating, it is a good sign of high intelligence.

“We also used the same method in testing the vocational choices of that group of our gifted children who are now in the high school. We got practically the same results. The majority of them were looking forward to careers that take superior intelligence, and involve the use of the hard subjects which they liked in school, namely, physics, chemistry, mathematics and the like. Nearly half of the gifted high-school boys are looking forward to either engineering or science, both of which require hard mental labor.

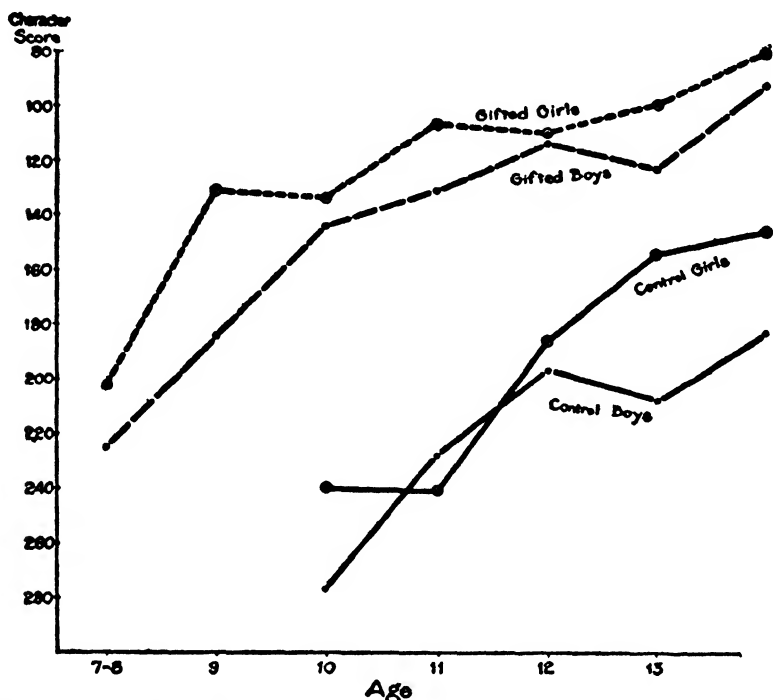
“Although I have already spoken of it, I should like to say a few more words here about the tests that we gave to these children to measure their moral development. The results may possibly be the most important of the entire research. I think they may be of greater interest to parents, teachers and employers than any of the discoveries that were made. The question to be investigated was this: Is the bright boy more likely to turn out to be the bad boy? Is the brilliant girl the one who is the more likely to go wrong?

“Our investigation gave a very happy answer to these questions. Most people believe that morality and character can not be measured. Psychologists are rapidly demonstrating that they can be. We found that our battery, consisting of seven tests, was only a little less reliable in measuring moral tendencies than are our intelligence tests for measuring intelligence (see chart next page).

“As evidence of the value of these tests, Doctor Vernon Cady went out to Long Beach, California, where the teachers picked out the seventy-five worst boys from twelve to fourteen years of age of the entire city of one hundred thousand people. They were the boys that were rated by from two to five teachers as being the worst boys in the city. By the same method were

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also selected the seventy-five whose teachers said were the most dependable, the best, finest and most trustworthy. He did not know the boys personally and did



This chart is Figure 30, from *Genetic Studies of Genius*, Vol. 1, reprinted by permission of Stanford University Press. It shows the progress in character and good behavior of gifted boys and gifted girls as compared with average boys and average girls. Seven tests of character progress were used. On the bottom line are the ages (from seven to fourteen) and the scores are at the left, a high score meaning "worse" and a low score meaning "better." It will be noted that both gifted and average boys get worse between about twelve and thirteen, showing at that age boys all have a hard time adjusting themselves and need especial understanding. After that age their average improves. But the girls, both gifted and average, keep getting better and better all the time from the very start.

not know to which group any of the boys belonged. The boys were sent to him after being picked out by their teachers. He tried out his tests on the two groups. He was wrong in some cases as there was some over-

lapping, but the tests separated the two groups fairly distinctly. They were quite successful in separating the sheep from the goats, the good from the bad. This marks a great step forward in the aid that psychology can lend to parents and educators.

“In addition to the special tests for moral character, we made another extensive investigation of the character traits and personalities of these children as compared with the average. We selected twenty-five traits, which, if not the most important, are certainly *very* important in character and personality. We had both teachers and parents give the closest estimate they could as to how each child ranked in each of the following twenty-five traits:

1. Health
2. Physical energy
3. Prudence and forethought
4. Self-confidence
5. Will and persistence
6. Musical appreciation
7. Appreciation of beauty
8. Sense of humor
9. Cheerfulness and optimism
10. Permanency of moods
11. Fondness for large groups
12. Leadership
13. Popularity
14. Sensitiveness to approval or disapproval
15. Desire to excel
16. Freedom from vanity or egotism
17. Sympathy and tenderness
18. Generosity and usefulness
19. Conscientiousness
20. Truthfulness
21. Mechanical ingenuity
22. Desire to know
23. Originality

24. Common sense
25. General intelligence

"Our first surprise was that the parents did not rate their children markedly higher than did the teachers.

"There are many other items about these children that I should like to tell, but here are just a few striking facts: The average age of the fathers at the birth of a gifted child was thirty-three and six-tenths years; of the mothers it was twenty-nine years. Where there are two or more children in a family, we found the first-born somewhat more likely to be the gifted one. This is in striking agreement with all previous studies of genius; but the cause of it is entirely unknown. We also found that among the parents of our gifted there were fewer divorces than among the general population. This in itself is an indication that the parents are not neurotic, one-sided, unstable and lacking in social adaptability.

"I think that one of the most gratifying things was the discovery that the large majority of our gifted children come from good homes. That does not necessarily mean luxurious homes, because we have a very precise scale of home ratings known as the Whittier Scale, which gives concrete standards as to what constitutes a 'good' home.

"We also rated by definite standards the neighborhoods in which these children lived. We found that the neighborhoods of our gifted children were only a little above the average; but the beautiful and significant thing was that, no matter what the neighborhood might be, when you got *inside the home*, there you found the difference.

"The average income of the parents of our gifted subjects is thirty-three hundred dollars. Some had much greater incomes and some less. But usually, no

matter what the income, the home was 'good.'

"Although men in the professional classes are pretty much in the minority, their homes furnish thirty-one per cent., or nearly one-third, of all our precocious children. We found that fifty per cent. of our gifted children had parents who belonged to such classes as the following: executives and business managers, sales and insurance agents, wholesale dealers, brokers, owners of large retail establishments, manufacturers, expert accountants, photographers, lithographers, landscape architects, retail dealers and owners of small stores, clerical workers, druggists, contractors, florists, telegraph operators, postmen and post-office clerks, and civil service clerks.

"Skilled labor furnished nearly twelve per cent. This group included carpenters, mechanics, machinists, farmers, tailors, butchers, painters, foremen, pattern makers, potters, bakers, cobblers, barbers, city firemen, soldiers, sailors and policemen.

"Nearly seven per cent. came from the semi-skilled classes, which includes teamsters, expressmen, waiters and so on.

"One final point in our investigation touches on a question which has been of immense interest all through human history, and is of great interest to-day. That question is: Why were there so many more gifted boys in our group than gifted girls? It bears upon the problem as to why so many more celebrated geniuses in the world's history have been men than women.

"For instance, in our main group of six hundred forty-three gifted children there were one hundred sixteen gifted boys to every one hundred girls; in our high-school group there was the astonishing difference of two hundred twelve boys to every one hundred girls. What makes the thing all the more mystifying is that all records everywhere

show that girls, on the average, make better school marks than boys, at all ages from six up to eighteen. Not only that, but all mental test records show that at any given age, say at eight or fourteen, the *average* intelligence score which girls earn on mental tests is slightly higher than that of boys.

"Of course you know that there are about one hundred five or one hundred six boys born to every one hundred girls. And in California the ratio of living children under high-school age is one hundred four and five-tenths boys to one hundred girls. But this slight difference is vastly less than the difference in the proportion of gifted boys to gifted girls, which in our high-school group is represented by the ratio of more than two to one.

"You might suspect that the teachers had been biased for some reason, and nominated more of their bright boys for us to test, but we ran that down and found there was nothing in it. Then there is the theory advanced by Havelock Ellis, of England, and Prof. Edward L. Thorndike, of Columbia University, that men vary more up and down from the average than do women. If this be true, while the average boys and girls would be the same, yet the supreme ranks would show more boys than girls. At the opposite end of the scale there would also have to be more stupid boys than girls. There is some evidence that there are more idiots among men than women, and certainly history shows more towering geniuses among men than women. Our information, however, is not conclusive either way.

"Now, in conclusion," said Doctor Terman, "I must urge you not to over-emphasize what we have done, or think we have done. We know perfectly well that we have merely made a beginning in a most interesting field.

“I am hoping that very soon some one who has money and wants to put it to a real service, a service that will bring returns incomparably greater than we usually get from money, and returns that will benefit the human race over a much longer time, will be willing to spend a million or two, indeed I hope many millions, on the endowment of an experimental school for the training of intellectually superior children, and for aiding teachers and parents to promote their development and welfare.

“We hope and believe that we have here laid the basis for making such an experiment a success; and as these children live out their lives, and go through the future years, and as, in the course of time, we can look back over their careers and read the truth of our own predictions, instead of looking forward as we are doing now—we hope and believe that we shall find that our studies of California’s gifted children have initiated a real advance in our knowledge of human education, and our ability to promote human welfare.”

CHAPTER XII

HAVE YOU A FUTURE GENIUS IN
YOUR HOME?

DR. CATHARINE COX MILES was born and educated in California, and is now associated with Prof. Lewis M. Terman, in a research to determine the mental and emotional differences between men and women. She received her Master's Degree and Doctor's Degree from Stanford, studied also at the University of California, and in 1913 and 1914 at the two German Universities, Jena and Berlin. Much of her time was devoted to the study of literature and languages. This, together with her extensive studies in psychology, has peculiarly qualified her for the enormous undertaking of investigating the childhood of the great geniuses of modern times, both a literary as well as a scientific research, and upon this fascinating three-year research she talks interestingly in the following interview. In 1918 and 1919, Doctor Cox was sent to Germany on the American Friends Service Committee for the Feeding of Children in Central Europe. During 1926 and 1927, she was psychologist of the Central Mental Hygiene Clinic, of Cincinnati, after which she returned to Stanford. She was recently married to Walter R. Miles, a distinguished psychologist. In the accompanying photograph, Doctor Miles is shown giving an intelligence test to her little nephew. May we hope she is here discovering another genius!

XII*

WHEN Hans Christian Andersen was only eleven years old he began to write stories and plays drawn from stories in Greek literature. He was such a delightful and interesting boy, although extremely sensitive, that the oldest workmen in the factory where the lad was employed often performed his duties for him in order that the boy might spend his time singing and acting out plays for their entertainment.

Voltaire began writing verses while he was still in his cradle, and at the age of ten he was discussing with distinguished scholars the important questions of the day. The poet Coleridge could read an entire chapter in the Bible when he was three; he read *The Arabian Nights* through at the age five; at the age of seven he was reading every book he could get hold of, and he wrote beautiful poetry before he was fifteen.

Macaulay learned to read at three. Sir Francis Galton, the founder of the sciences of eugenics and biometrics, learned to read at two and a half. He could do the multiplication table at five, and at six was thoroughly familiar with the *Iliad and the Odyssey*. Charles Dickens wrote tragedies at the age of seven. Tasso began to study grammar at three. Goethe, at the age of seven, wrote sustained dialogues that would do credit to a college senior; at fourteen he was studying the history of philosophy, jurisprudence, science and literary criticism.

Samuel Johnson, the English philosopher, learned to read while still in petticoats. When neighbors came

* This chapter is practically entirely the work of my wife, Elizabeth Jayne Wiggam, and was published by her in *The American Magazine*, September, 1927.

he used to climb a tree to keep away from being exhibited as a prodigy. He read *Hamlet* so early that the speeches of the ghost in the drama terrified him when he was alone. Grotius, the Dutch lawyer and founder of international law, graduated from the University at fourteen, and at twenty-four was Attorney-General of Holland. John Stuart Mill, the English economist, read Greek at the age of three, and was writing articles on logic and economics at the age of twelve.

Emerson wrote a long poem with "critical and explanatory notes" and signed it R. W. Emerson, LL.D., at the age of ten. Just before his third birthday Emerson's father wrote of him, "He does not read very well." (!) A good many boys do not "read very well" at the age of three. At the age of fourteen, John Quincy Adams was private secretary and interpreter for Dana, a special emissary of the United States Government to Russia, and at sixteen he was one of his father's secretaries during the peace negotiations of 1783 in Paris.

On the other hand, Abraham Lincoln did not, as a boy, show any clear indication of his future greatness, although at the age of seventeen he wrote a beautiful poem for his sister's wedding; also about this time he wrote, or rather adapted, the following lines:

"Good boys who to their books apply
Will all be great men bye an bye.

"Abraham Lincoln, his hand and pen:
He will be good, but God knows when."

General Grant was not noted as a scholar while a boy but was chiefly famous for his horsemanship. His father said of him at the age of ten, "Whatever he undertook to ride, he *rode*."

George Washington, at the age of fifteen, did not seem to bear great promise of being more than an extraordinarily good professional surveyor, although at twenty-two he had achieved the rank of lieutenant-colonel of a Virginia regiment and was noted for his coolness and energy. By the time he was twenty-eight, his reputation as a military commander was firmly established.

Sir Isaac Newton was a farm boy at the age of fifteen, helping to eke out a poor living for himself and his mother. Nothing seemed more improbable than that he was destined to become perhaps the greatest name in all English science. By chance, as the story goes, his uncle was visiting the farm, when one day he discovered the lad under a tree reading a difficult treatise on higher mathematics, while the horses with which he was plowing stood idly by in the furrow. His uncle chanced to be a university man, and at once made arrangements for young Isaac to be given a university education.

Victor Cousin, the great French philosopher and writer was, at the age of ten, a ragamuffin boy playing in the gutters of Paris. One day on the street he thrashed a boy much bigger than himself who was bullying a small one. By good fortune, the mother of the small boy who was being imposed on witnessed the affair. By good fortune, too, this woman was quite wealthy. She investigated young Victor and, finding that he was apparently a bright lad, she financed his education. And at the age of eighteen, he was carrying off notable prizes in the University of Paris.

It is evident from these brief anecdotes, taken almost entirely from a prodigious research upon the childhood of great geniuses, made by Dr. Catharine Cox (now Mrs. Walter Miles), of Stanford University, that, while some geniuses have compelled the world to

sit up and take notice almost from the day they were born, in the case of others, it seems as though some lucky accident led to the discovery of their talents and paved the way to their future fame. It was with the view of throwing light upon these and many other important questions concerning genius that Doctor Cox back to the year 1922 undertook this research to try if possible to discover the stuff of which geniuses are made.

Just what part inborn abilities and temperamental qualities play, and what part is played by circumstance, stimulation and opportunity in the production of the thing we call genius, perhaps no one will ever be able to say with absolute certainty. It seems, however, on the very face of it that so many geniuses have owed so much to circumstance and a peculiar combination of opportunities, that there must have been a good many boys and girls of equal ability in the past to whom these lucky chances did not come. On the other hand, when we examine the life of any genius and examine the lives of his brothers and sisters and those of the boys and girls with whom he grew up and who would seem to have had just as good opportunities, we are impressed by the enormous power of native talent to break through even the most discouraging environment and forge its way to fame and fortune.

Prof. Lewis M. Terman was at that same period engaged on his now famous study of one thousand gifted children in the California schools. He suggested that Doctor Cox undertake on a large scale a scientific investigation of the childhood of three hundred geniuses born between the years of 1450 and 1850, thus approaching this fascinating study from the angle of genius at its height instead of from the Terman angle of genius in the making.

So Doctor Cox searched through the centuries, and from history, science, literature and the arts made her selection and as she said to me "almost adopted these wonderful historic children as her own."

During the first year of her investigation into the lives of her charges, Doctor Cox, with two assistants, collected over fifteen thousand biographies, cyclopedias, memoirs and other documents containing material about these three hundred geniuses. She later reduced this enormous mass of material to three thousand volumes, for intensive study, finally condensing her findings into a book of nearly nine hundred pages, entitled *Early Mental Traits of Three Hundred Geniuses*, which is published by Stanford University.

It was a stupendous task, and recently I spent two days with Doctor Cox talking with her about it. She was then psychologist of the Central Clinic of Cincinnati, helping boys and girls to discover their real abilities and make the most of themselves in life.

"I lived with those adopted book children of mine so closely for four years," she told me, "that I actually came to think about them as my boys (only eight of the three hundred children, by the way, were girls). They were real children to me, just as real as the boys and girls whom I have watched grow up."

"Before we go into the specific characteristics of different geniuses," I said to Doctor Cox, "I should like to know if some of the traits you discovered were common to all of your geniuses; that is, did Benjamin Franklin, George Washington, Rembrandt, Goethe, Bach, Humboldt, Charles Dickens have the same *fundamental* characteristics?"

"They certainly did," she replied. "Four things stood out very clearly in the childhood of nearly all the geniuses I investigated: Obstacles brought out their fighting powers; they were steadily persistent in their

undertakings and motives; they carried important tasks through on their own initiative; and their wish to excel amounted almost to a passion. These four were their outstanding characteristics, and I am convinced they are the strong characteristics of nearly all the successful men and women of to-day. These four traits not only marked these famous men and women in adult life, but they were the strong features of their childhood. And besides these four traits in which they were particularly strong, we rated them on sixty-three other traits of personality and moral character, as I shall show later, and on these we found that even as children the great geniuses would have rated distinctly above children in general.

“My investigation, of course, was made for comparative reasons. We wanted to know whether these children who actually did become famous men were like the gifted school children Professor Terman investigated. Professor Terman’s question is: What do children who score high on intelligence tests become in later life? My question was: Would those persons *who have already become famous* have scored high on intelligence tests when they were children? Also, how did their other personality traits compare with those of Professor Terman’s children?

“He is looking from the child forward to the great man or woman. We are looking from the great man or woman backward to the child. We shall have to wait for his children to grow up to determine how closely our results agree. But in the end we are really trying to answer these two questions:

“First: What are the childhood signs and symptoms of future great abilities and strong personalities?

“Second: Do great abilities and strong personality traits in childhood prophesy future achievements of a high order?

"Our first step was to collect each child's sayings, writings, achievements, and early doings of all sorts, and from these to try to calculate how each one would probably have scored on our present-day intelligence tests, which show us each person's Intelligence Quotient, or IQ, as it is familiarly called. The average person's IQ is 100.

"The material for each child was divided into two parts: From birth to the age of sixteen, and from sixteen to twenty-six. We thus obtained two IQ estimates on each genius. In most cases, the second IQ was considerably higher than the first. The average for the first sixteen years was 135. The average for the second period was 145.

All the IQ ratings were made by myself in cooperation with five other psychologists well-qualified to estimate the intelligence of children. Each rater made his estimates without the knowledge of the ratings of the others and we therefore believe that by combining all the ratings into one we secured very unbiased ratings of the intelligence of each child from the available material.

"We have a number of technical reasons for believing that the actual IQ's were considerably higher than these. For example, we rated John Bunyan, author of *Pilgrim's Progress*, Copernicus, the astronomer, and Faraday, the great scientist, at 105. We rated Andrew Jackson, General Grant, Raphael and Rembrandt, at 110; Admiral Farragut, DeFoe, author of *Robinson Crusoe*, Garibaldi, Haydn and President James Madison at 120; George Washington, General Sherman and Bach, at 125. However, Charles Dickens, Thomas Jefferson, John Milton, and Daniel Webster rated at 145; Voltaire at 170; Pascal, the mathematician, and Macaulay, the historian, at 180; Goethe, the German poet, at 185; while the highest rating of all

was that of John Stuart Mill, the economist, at 190.

“This does not mean we really believe that Charles Dickens and Daniel Webster were actually brighter as boys than George Washington and General Sherman, or that they in turn were brighter when boys than were General Grant and Andrew Jackson. It simply means that the material we could find about each one of them would indicate the IQ score of each one of these boys to be at this level, provided this material were all that was ever known about him.

“But as a rule the more material we could find about a boy the higher was his estimated IQ. And we believe the reason why the average ratings for intelligence were higher for the second period from sixteen to twenty-six than for the first period from birth to sixteen is not because we found their real native intelligence had increased so greatly but because we had more and better material to work on for judging the later years of our geniuses.

“It is generally conceded that your IQ does not change much as you grow older. For instance, if we could have tested Abraham Lincoln as a boy and tested him again as president, his rating would probably not have shown much change.

“But we drew blanks on the childhood of a number of the greater geniuses. We could not find enough material on Shakespeare, for instance, to give him a rating. What a bright light would have shone on the study of genius if his early traits had been recorded!

“From the evidence at hand we came to the conclusion that the scores of these three hundred young geniuses in an actual intelligence test would have averaged at least 165. A few, such as Goethe, Emerson, Franklin, Jefferson, Milton and Coleridge, might have rated 170 to 200 or even higher.

“There are undoubtedly many thousands of children

in the United States whose intelligence tests would rate above 140. And I believe that modern methods of psychological measurement will make it possible from now on to discover many of these peculiarly gifted children in their early school-days.

"This will mean, we hope, that the high-score children, who were formerly kept down by lack of training or by unsuitable training, will now, with the greater educational opportunities afforded them, be able to make the truly great achievements that we have a right to expect of them. It is quite possible that just as many geniuses have been suppressed and remained 'mute, inglorious Miltons' in the past as have actually come to light.

"But even intelligence, important as it is, isn't all," continued Doctor Cox. "And I came out of the investigation with the firm conviction that, while a child must score pretty well up on the intelligence scale to make great achievements in later life, those personality traits such as persistence, industry, foresight, patience, courage, will power and the like are of immense importance in determining a man's worldly success.

"One of the very first things to notice about a child as a sign of real ability is how old he is when he says and does bright things. For example, many children write good school essays when ten or twelve years old; but the great statesman, Mirabeau, at the age of five years and six months, wrote the following composition addressed to himself:

" 'MONSIEUR DE MIRABEAU: I beg you to pay attention to your writing and not to make blots on your copy-book, to take notice of what is done, to obey your master, your father, your mother; not to be obstinate; no evasions, honor above everything; attack nobody unless you are attacked yourself; defend your country;

be not disagreeable to the servants, nor be familiar with them; conceal the faults of your neighbor, because that may happen to you yourself.'

"Perhaps your boy or girl does not care for writing. Maybe he is interested in mathematics. Many children do well at figures; but how many can do what little Blaise Pascal did? He actually 'invented' geometry when he was twelve, and worked up to Euclid's thirty-second proposition before any one knew what he was doing.

"Perhaps your boy likes to make things. How does he compare with Robert Fulton, inventor of the steamboat? Before young Robert was thirteen he pounded out lead for a pencil, performed experiments with quicksilver, drew designs for firearms, and became expert in determining the carrying distance of different types of rifles.

"Perhaps your little girl is musical. Does she, like Mozart at three or four, begin to invent musical ideas? Does she sit at the piano and pick out thirds, and does she write out her own first compositions at seven?

"These are only a few of many outstanding examples," said Doctor Cox. "What I wish to get across to parents and all those who deal with children is the importance of noticing *at what age* these things are accomplished.

"We often hear it said that Johnny or Mary is slow, but will wake up later on. Many great men are reported to have been very dull as children. The poet Goldsmith's teacher said of him, 'There never was so dull a boy.' It was recently stated that Daniel Webster was also slow as a boy. Now, let us look at the real facts: Goldsmith had shown signs of genius at an age when he could scarcely write, and he was distinguished for his verse before he was ten years old. Webster

was poorly prepared in Latin and Greek when, at fifteen, he started to Dartmouth College; but this merely indicated he had had poor schooling.

"I found all through my investigation that poor schooling and poor home training, where they occurred, were undoubtedly a handicap to these geniuses. In some cases too, it seemed as though chance opportunities had played a major part in their success. The impressive thing was, however, that these boys and girls *took advantage of whatever opportunity occurred*. Their schoolmates, when offered the same opportunity, did not respond. Daniel Webster is a good example of this. His early schooling was often interrupted, because his father needed his help on the farm; he had one year only of actual college preparatory work; but when he did get to college he soon won a reputation for scholarship, and at eighteen was selected to deliver a Fourth of July oration. Webster's memory was always excellent. When he was only eight years old he read the Constitution of the United States, printed on a handkerchief which he bought at a county fair, and remembered it almost verbatim all his life.

"Things like that are significant in every boy as well as in Daniel Webster. They show not only a good memory, but also a memory that retains things of importance. There are people of very moderate intelligence who can remember telephone or automobile numbers or all the cards played at bridge; but try them on remembering the Constitution, or a newspaper editorial, and they are lost.

"In the school for feeble-minded in California, for example, there is a boy who remembers the time of day, the number of the engine, and the number of cars on the train in connection with the arrival of every visitor who has been at that school within the past ten years. The stunt is so extraordinary that at every

public entertainment they have this boy go through this performance. Now, that is indicative of a particular type of memory that is often associated with a feeble-minded person. This has led to a popular impression that geniuses are just one-sided persons with a few gifts in some particular directions and that they are very often rather lacking in other directions. The French writer, Chateaubriand, for example, discovered when he was a youth that he had an unusually accurate memory, and this led him to fear that he was feeble-minded because he had heard that an extraordinary memory was frequently associated with general feeble-mindedness. Our study entirely contradicts this theory. Not a single one of our geniuses rated lower than the average in general intelligence. In fact, if we had been able to test them with our present-day methods, our whole conclusion would have been that in general intelligence every one of them rated, as I have already said, as high as 165, and that is far above average intelligence.

“Charles Darwin is another boy who was labeled slow and dull. He himself said that his younger sister, Catherine, learned faster than he, and that his father and teachers considered him very ordinary. But what are the facts? When little Charles was only eight he made a large and very careful collection of coins, plants, shells, stones and other natural objects, and at ten he had classified them. He did not care much for Latin, but spent many hours working with his brother Erasmus, who had a little chemical laboratory. And by the age of twenty-two Darwin was looked upon as a coming man in science.

“Another fact that my investigation brought out very clearly,” continued Doctor Cox, “is that every step in a child’s life explains the next. For instance,

nearly all children make collections. Some collect the tops of milk bottles, some collect cigar wrappers and other insignificant objects. But if a child collects and classifies things of *real importance*, as little Charles Darwin did, there is scarcely any better sign of true mental power.

“It is this sort of thing that gives a child his background for later achievements. Whenever you hear of a man doing a great thing you may be sure that behind it somewhere is a great background. This background may be a mother’s training, a father’s example, a school-teacher’s inspiration or intense experiences of his own; but it has to be there, or else the great achievement does not come, no matter how favorable the opportunity.

“Some boys are constantly developing their own background, even against obstacles. Parents should observe closely how their children meet obstacles. Obstacles give some people just the fighting stimulus they need, while others are discouraged by them. Liebig, the great German chemist, who is best known to us by his beef extract, is an example of the first kind. Liebig’s teacher said to him: ‘What do you think you will amount to if you don’t study your Latin and Greek?’ The boy replied, ‘I’m going to be a chemist,’ and the whole school laughed in derision. Even the teacher did not know what a chemist was. There was no such thing in those days.

“Liebig’s father, however, was an apothecary, and the boy and his brother got some chemicals and began experimenting in the back of the shop. They blew the roof off one day; but even that obstacle did not deter young Liebig. He went on, and became the father of modern agricultural chemistry.

“There is another point of extreme importance

in every child's education that I should like to bring to the attention of every present-day father. Liebig's father took the boy about to see all sorts of manufacturing operations. Benjamin Franklin's father did the same thing. This gave these boys an opportunity to see a variety of activities and familiarize themselves with all sorts of interests and occupations. They also met mature people and saw them at work. It is a great mistake to look down on children and exclude them from adult interests."

"All that you have told me up to the present," I said to Doctor Cox, "seems to indicate that these children had a natural bent in some one direction. Are we all born with these natural bents, or at least a trend in a definite direction?"

"Well, in all these children whose lives we investigated," she replied, "our information indicates an early trend in the direction of their future achievement. In every case the child seemed to be father to the man. Lincoln as a child was always asking curious and important questions. Watt, inventor of the steam-engine, stood for hours at a time holding a spoon in front of the teakettle spout, while his aunt scolded him for not doing something instructive. The poets wrote verses before they were ten; several composed before they could write. The artists, musicians and inventors were drawing, extemporizing or inventing before their teens. Ulysses S. Grant showed unusual organizing capacity even as a farm boy, and was a famous horseman. He was later the finest horseman at West Point. Andrew Jackson was an unconquerable fighter in school.

"William Herschel, the astronomer, was trained by his father as a musician; but when not much more than ten, he and his father would sit up far into the night discussing astronomy and mathematics, while an elder

brother, who had the same opportunity, was snoring in bed near by. Finally, William's passion for astronomy proved the stronger; he abandoned music, and at thirty-five was a famous observer of the stars.

"Some parents have tried to force their children into a special pattern, but there is a limit to their success. Karl Weber's father tried desperately to make him a second Mozart, who at the age of five was being exhibited as a pianist all over Europe. When little Karl was nine the father gave up the experiment. What happened? Some years later the boy, this time of his own accord, went back to music, and at eighteen was a distinguished composer.

"Parents should hold up models and heroes before their children, but should not try to make them into cheap imitations. The great thing is to bring out the *individuality* of each child.

"I wish to emphasize one thing here: Parents can not create talent or genius, but they can greatly discourage or even suppress it. A child may be another Lincoln or Longfellow, and yet be ruined for lack of opportunity. I don't suppose there is any one thing that acts as a complete obstruction; but adverse circumstances, especially lack of education, often act as a gradual hindrance all along the line, while education and opportunity continuously act as accelerators.

"Would you say, then," I inquired, "that a great many famous men and women owe much of their success to their mothers or fathers or to some teacher or relative?"

"There can be no doubt of it," rejoined Doctor Cox with emphasis. "Take the story of Alexander von Humboldt and his brother William. There are probably more towns, rivers and mountains in different parts of the world named in honor of Alexander Humboldt than of any other person in history. The father

died early, and the mother, who was a noblewoman, supervised her boys' education. She secured the ablest instructors, twelve teachers in all, the names of eleven of whom are still found in the German encyclopedias. Thus from childhood the boys were brought into touch with great men. The mother also sent them on journeys to meet distinguished persons in other countries. Moreover, very early in life they were given important responsible tasks to perform.

"Now, here are three interesting things to note: The first is that, while these boys had the same instructors and education, William very early took to literature and Alexander to science. They both became eminent statesmen, but in different lines. William became the foremost literary critic of his day and was the father of the educational system of modern Germany. Alexander, although very frail as a child, later became a great mountain climber and explorer, and is famous in many fields of science.

"The second thing is that it was this wide education which made the vast range of their achievements possible. Had they had a meager early training, such as that of Bobbie Burns or Antonio Canova, I think they would have achieved success in some *one* line; but the enormous range of their achievements was largely due to the opportunity and education given them.

"Then comes a third thing which is of importance to every parent. The Humboldt boys early formed the habit of unhesitatingly undertaking important tasks and carrying responsibilities.

"I feel that it is of the greatest importance to teach children very early—the earlier the better—the *habit* of undertaking difficult tasks and the habit of carrying them through to a satisfactory finish. Of course this thrusting of responsibility on children while still very young must be done with caution and judgment.

“Another fine example of a boy shouldering responsibility is Admiral David Farragut. A friend who was in the Navy said to the family that he would like to take one of the Farragut boys on his ship. David at once said, ‘I’ll be the one.’ He was made a midshipman at nine and placed in command of a boat at eleven. During the War of 1812, although not quite thirteen, his captain placed him in command of a captured ship with the enemy captain and crew on board. The enemy captain tried to take the command away from the boy, but young Farragut enforced his own orders and brought the ship safely to port.

“Of one thing I’m quite certain, and that is that the mother or father who tries to shield the child from all the hard things and holds him back from shouldering a fair share of responsibility in proportion to his strength is taking away one of the greatest educational opportunities.”

“Can you think of any other parents or relatives of these remarkable children who exerted strong influences upon their careers?” I asked Doctor Cox.

“Well, take the Wesleys, John and Charles. In their case both parents did their utmost to give their children an all-round education. The father of John Stuart Mill, the economist; of Goethe, the poet; of Niebuhr, the German historian, and of John Adams, the statesman, is a famous example of fathers who gave an all-round intensive training to their sons. John Adams took his son John Quincy abroad as his special secretary before he was twelve, and introduced him to the eminent men of Europe.

“Edward Jenner, who discovered vaccination, was reared by an older brother, who gave him every opportunity and inspiration. One day the boy heard a country woman say that she could not take smallpox because she had had cowpox. This simple remark is

said to have led Jenner's mind to the discovery of vaccination. But without the scientific education provided by his elder brother it may well be doubted if Jenner's mind would have been led to his great discovery.

"In the case of Jacob Grimm, it was a maiden aunt who gave the boy and his brother their education. Heaven bless those maiden aunts who have given so many boys and girls their chance in life and who have been such an important factor in the lives of a number of our geniuses! Without this careful training I doubt that we should ever have had Grimm's *Fairy Tales*. It was Abraham Lincoln's stepmother who perceived the boy's remarkable gifts and was his boyhood inspiration. You will nearly always find mothers and fathers, uncles and aunts and teachers, older brothers and sisters in that great background which is so important in the preparation of a genius."

At this point I said to Doctor Cox, "I wish you would bring out how much importance you attach to such personality qualities as will power, ambition, hard work, perseverance, self-confidence and similar traits."

"Practically all the geniuses I classified," replied Doctor Cox, "displayed these traits early and very strongly. Of course they may be inborn qualities, just as unusual intelligence is inherent in some and not in others. However, we believe these personality qualities can be cultivated more readily than intellectual ability. And one thing is certain—that, without them, intellectual ability will never get very far.

"We found that in the case of statesmen, such as Burke, Jefferson, Peel, Webster, and among religious leaders, such as Calvin, Luther, Wesley and Penn, force of character, desire to excel and general balance and evenness, seem to have played a somewhat larger part than in the lives of artists and writers. Richard

Cobbett is a fine example of what indomitable will, with only moderate mental brilliancy, can accomplish. He was a prodigy of hard work. As a boy of eight or nine, after working long hours as assistant to a gardener, he would study far into the night. Bobbie Burns did this too; but Burns read Shakespeare, while Cobbett studied only practical things. By developing his moderate abilities to the utmost Cobbett became a powerful English leader.

"It is difficult to state in a few words the relationship between the character and personality traits and the purely intellectual abilities in producing great achievement. I should say that you can cultivate, in a very well-balanced and capable youth, those characteristics that make a statesman, more readily than you can those seemingly more distinctive things that make a great musician or an artist.

"Take George Washington as an example. Even as a boy, he was described as being 'level-headed.' He did not show extraordinary gifts in any one direction. He had what we might call general capacity, balance and judgment. Are not these just the things that make a statesman? They make the people feel they can rely on them in an emergency. Young George Washington was hard-working, careful, accurate. No one would have made the mistake of thinking he was going to be a poet; but as you read about his childhood you find everywhere the portrait of the future man painted in the traits of the boy."

"What would you say about the physical health of your famous children? A great many people think if a child is long on brain he's short on brawn."

"It is true," said Doctor Cox, "that there is a popular impression that precocious children are likely to be frail and sickly; but we found these boys averaged *better* in health and vitality than boys in general.

There were a number out of the three hundred who had poor health. But that is also true in any group of three hundred children. And remember, many geniuses probably went through life handicapped by some disease or defect which would nowadays be prevented or cured in childhood.

"Since five times as many of these geniuses were still living at the age of seventy as we find among people in general, it surely indicates that bright children are not lacking in physical stamina because of their high ability or intense mental activities. The amount of work they turned out in itself indicates that they must have had pretty powerful constitutions.

"And I should like to dispel another popular delusion. Many people imagine geniuses have usually been dissolute. This is true only in rare cases."

"That brings me," I said, "to my final question: Did you make any effort to estimate the personality traits of these children of genius? What can you tell us about their temperaments? Were they self-willed or strong-willed? Were they the type of children that make an old bachelor glad or sorry he didn't marry?"

Doctor Cox smiled. "I took a list of sixty-seven mental, moral and volitional traits, partly worked out by Webb, an English psychologist, and partly worked out here at Stanford; then two separate judges, Miss Mary Meyrick, a competent psychologist, and myself, rated my three hundred geniuses on all these sixty-seven traits. The traits on that list are those which we deem especially desirable in present-day children. They furnish a pretty complete picture of a girl or boy and show what sort of stuff the children are made of. If parents would make accurate and careful ratings of their children on these traits they would perhaps see where their training had been successful, and perhaps, too, where it had been misdirected.

"The inspiring thing is that the geniuses, even as children, passed this test with flying colors. Taking them as a group, they were certainly fine children. This does not mean that all of them were always obedient children, or easy to manage. But on the side of the *positive* moral and personality traits they scored distinctly above the ordinary.

"The scientists stood very high in force of character, balance, desire to excel, originality, tendency not to be changeable, quiet determination and persistence of motive. Boys who achieved eminence as artists had, we noticed, several strong personality trends: Their degree of esthetic feeling and desire to excel were highly developed; they believed firmly in their own powers, and possessed a great deal of originality in their ideas. They were also very intelligent and persistent.

"Boys who later became poets, novelists and dramatists, rated high on the following: A desire for leadership, originality of ideas, memory, keenness of observation and the amount of mental work they bestowed upon pleasures. Moreover, they estimated their own special talents with considerable correctness. But, on the whole, the poets they rated a little lower in persistence, balance and soundness of common sense; and on the trait where action and thought are dependent upon reason they did not rate high.

"The future essayists, historians, critics and scholars ranked high in desire to excel, memory, trustworthiness, conscientiousness, absence of conformity, profoundness of apprehension, and rating their own abilities correctly and working toward a distant goal.

"As was to be expected, the soldiers ranked high in desire to be leaders, in physical bravery, persistence in the face of obstacles and quiet determination.

"Summing up the whole matter, it is evident that

both heredity and environment play their parts in the lives and successes of geniuses just as they do among ordinary people. Young geniuses, however, do display in childhood superior intelligence, superior talents and superior traits of character. I should say that if your child shows good general ability, combined with seriousness of purpose and indomitable persistence, you may well greet this as indicating a capacity for fine adult achievement. If these qualities are of the highest degree in your child, especially if coupled with some outstanding special talent, they indicate the possibility of those extraordinary achievements which mark the true genius.

“It is through education, determination and persistence alone that the humblest or the greatest man can ever reach the highest development of his inborn worth.”

It would be extremely valuable, I think, for parents to know how their own children might rate on the traits that have characterized great geniuses. It would also be very valuable for young people to rate one another. For that reason, Doctor Cox and the Stanford University Press have extended us the privilege of printing herewith from Volume II, of *Genetic Studies of Genius*, the list of traits upon which she and her associates rated one hundred of the children who later became famous.

It was found that in these sixty-three intellectual, moral, emotional and volitional traits these famous children averaged one and three-tenths points above the average of ordinary, unselected, school children of to-day. The traits are divided into thirteen subgroups, according to the element which is the most dominant factor in each group. Doctor Cox had sixty-seven traits in her list, but since four of these are subtraits,

we have included here only the sixty-three basic traits. The following paragraphs set forth the methods for rating yourself or your children.

First, rate yourself as accurately and honestly as you can on each trait, then add up your ratings and divide by sixty-three. Then have two or more of your friends give their ratings of you. It is better to have one of your friends have two or three of your other friends do this anonymously. Either you or your friend should then add each set of ratings and divide by sixty-three and compare the various ratings.

To get an average of all the ratings of both yourself and your friends, you will, of course, have to add all the ratings into *one* sum and then divide by the *total number* of ratings. That is, if you wish to secure the average of the ratings by yourself and one friend, you must add both sets of ratings into one sum and divide by twice sixty-three, that is, by one hundred twenty-six. If you average up three ratings, in that case, divide by one hundred eighty-nine, and so on to the end.

The steps of the trait-rating scale are as follows:

Plus 3 denotes the possession of a very high degree of the quality as compared with the average.

Plus 2 denotes the possession of a degree of the quality distinctly above the average.

Plus 1 denotes the possession of a degree of the quality slightly above the average.

0 denotes the possession of the average degree of of the quality among youths in general.

Minus 1 denotes the possession of somewhat less than the average.

Minus 2 denotes the possession of distinctly less than the average.

Minus 3 denotes the lowest degree of the quality as compared with the average.

EXPLORING YOUR MIND

TRAITS

(I) EMOTIONAL

1. General tendency to be cheerful. (As opposed to being depressed.)
2. Absence of tendency to quick oscillation between cheerfulness and depression.
3. Absence of liability to be fearful. (Anxious.) Tendency not to find causes to worry.
4. Tendency to be imaginative.
5. Degree of esthetic feeling.
6. Degree of sense of humor.
7. Degree of enthusiastic interest.
8. Sensitiveness to criticism.
9. Degree of introversion. (Tendency to live within himself.)
10. Reserve. (Tendency to remain silent on matters of personal concern.)
11. Constancy in friendship for persons of the same sex.
12. Constancy in affection for persons of the opposite sex.

(II) EMOTIONAL-SOCIAL

13. Family affection.
14. Friendship or affection for members of the same sex.
15. Friendship or affection for members of the other sex.
16. Loyalty to friend or cause.
17. Punctilious behavior. Gentlemanliness. Formal courtesy.

(III) SOCIAL

18. Fondness for large social gatherings.
19. Fondness for small circle of intimate friends.
20. Fondness for companionship as opposed to solitariness.

21. Impulsive kindness.
22. Tendency to do kindness on principle.
23. Degree of corporate spirit (in whatever body interest is taken).
24. Trustworthiness. (Keeping his word or engagement).
25. Conscientiousness.
26. Desire to be liked by his associates.
27. Wideness of his influence.
28. Intensity of his influence on his special intimates.
29. Degree of tact in getting on with people.
30. Sense of corporate responsibility.
31. Sense of justice.

(IV and V) SELF-TRAITS

32. Absence of offensive manifestation of self-esteem. (Superciliousness).
33. Desire to excel at performance, (whether of work, play or otherwise).
34. Desire to impose his own will on other people. Desire to be a leader.
35. Belief in his own powers. (Self-confidence.)
36. Esteem of himself as a whole. (Tendency to rate his own abilities correctly.)
37. Esteem of his special talents. (Tendency to rate them correctly.)

(VI) INTELLECTUAL

38. Absence of readiness to accept the sentiments of his associates.
39. Quickness of apprehension.
40. Profoundness of apprehension.
41. Soundness of common sense.
42. Originality of ideas. (Independence of thought, creativeness.)
43. Degree to which action and thought are dependent on reason.
44. Strength of memory.

45. Keeness of observation.

(VII) INTELLECTUAL-SOCIAL

46. Interest in religious beliefs and ceremonies.

47. Pure-mindedness. (Extent to which he shuns vulgarity or immorality.)

(VIII) INTELLECTUAL-EMOTIONAL

48. Self-criticism.

49. Neatness, accuracy, attention to detail.

(IX) INTELLECTUAL-ACTIVITY

50. Extent of mental work bestowed upon usual studies.

51. Extent of mental work bestowed upon pleasures, special interests, etc.

(X) BALANCE

52. Balance.

(XI) STRENGTH OR FORCE OF CHARACTER

53. Forcefulness. Strength of character as a whole.

(XII) ACTIVITY (PERSISTENCE)

54. Degree to which he works with distant objects in view.

55. Tendency not to abandon tasks in the face of obstacles.

56. Tendency not to abandon tasks for mere changeability.

57. Degree of strength of will or perseverance. (Quiet determination.)

(XIII) ACTIVITY (PHYSICAL)

58. Degree of bodily activity during school or business hours. (Energy.)

59. Degree of bodily activity in pursuit of pleasure.

60. Tendency to self-expression in action rather than in thought. (Hyperkinetic vs. hypokinetic.)

61. Skill in and devotion to athletics, sports, or physical feats.

62. Physique. (Soundness of bodily constitution, Good health.)

63. Physical bravery.

CHAPTER XIII

How Musical Are You?

MANY a musician in the future will doubtless owe the early discovery of his own talents to the work of Carl Emil Seashore. Professor Seashore was born in Morlunda, Sweden, in 1866, and graduated at Gustavus Adolphus College, in 1891. In 1895, he received his Doctor's Degree from Yale University, and in 1897 was called to the University of Iowa where he has been successively assistant professor, professor, head of the Department of Philosophy and Psychology, and dean of the Graduate College. He became dean in 1908, and is thus, in point of service, next to Dean West of Princeton, the oldest acting dean in any American university. In addition to many researches of importance, he has published a number of helpful popular books, including *The Psychology of Musical Talent* and *Psychology in Daily Life*. His famous *Open Letter to College Freshmen* has been printed in many editions. Dean Seashore, as Field Representative of the Division of Educational Relations of the National Research Council, has recently carried to an advanced stage a five-year study of American colleges and universities. In this capacity he has held prolonged conferences with more than one hundred fifty faculties. This research has recently been summarized and published by the University of Iowa under the title, *Learning and Living in College*. As a mechanical inventor alone, Seashore would rank high, owing to the numerous devices he has perfected for measuring fine psychological and neuro-muscular reactions. We owe nearly all of our knowledge of the psychology of music to Seashore and the students who have grown up under his leadership. In the following interview he discourses delightfully upon his work in measuring musical capacity.

XIII

WHEN I was a boy, we had a little girl neighbor, named Alice, whose parents were determined to make her into a musician. They had a vision of her some day being the pianist in the little church, and they even dreamed of little Alice mastering the pipe organ, should the church ever own one.

They were obsessed with two ideas: first, that Alice must have the same educational advantages that a neighbor, the stove-factory owner, was giving his children; and, second, that being church pianist would make Alice socially prominent and enable her to capture some eligible young man in the congregation for a husband.

The parents had considerably less musical talent than a wooden Indian, and Alice had thus inherited a double absence of musical capacity. Yet four hours a day for six long years that poor weary child was compelled to sit bolt upright on a piano stool, counting, one, two, three, *four*, one, two, three, *four*, until finally she learned to play *Jesus, Lover of My Soul* (to the immense delight of her proud parents) with not more than a dozen errors in each stanza.

And poor Miss Woolley, the teacher! I can see her yet—sweet, patient, smiling, full of music and smelling loudly of musk. We boys used to claim that we could put our noses to the keyhole of the “front parlor” at Alice’s house and tell whether Miss Woolley had been in to give her morning lesson. I got a whiff of musk not long ago in an auction room in New York, where they were selling some old Oriental tapestries. I hadn’t smelled it in forty years; but instantaneously

the picture of Alice arose in my mind, with Miss Woolley bending over her, patiently guiding the child's weary, unmusical fingers up and down the keyboard.

When Alice was fifteen she died of curvature of the spine, tuberculosis and piano practise. Shortly thereafter her parents followed her across the Jordan. I hope they all went to Heaven, especially Alice; but if they were taken into the heavenly choir, they have certainly ruined that aggregation as a musical organization. I hope, however, that the parents first had to spend six years in purgatory, each practising four hours a day on a piano while little Alice looked down on them gleefully from a beautiful playroom full of flowers and sunshine and children's laughter, where she was privileged to draw pictures to her heart's content, the one thing that Alice could do beautifully, happily and well.

And Alice's parents are not the only parents that I hope are going to get a good dose of purgatory before they get to Heaven, in order to expiate the crimes they have committed against helpless unmusical children. And there are still other parents who I hope will be there, too, compelled to long for something they can't get just as their really musical children have longed for a musical education.

For we are spending to-day, according to one of our leading music journals, two hundred twenty million dollars a year for musical education in America.

This means that in comparison with other forms of education we are spending on musical training approximately the following sums: Four times as much as for all American public high schools. Three times as much as for all our colleges and universities. Twenty-four times as much as for our normal schools.

If, to be on the safe side, we divide these figures in half, we are still spending more money on musical

education than for any other single kind of education in America.

And the tragedy is that probably half of it at least is worse than wasted, for two reasons: First, because a great deal of it is expended on children like Alice, who could no more be made into musicians than a one-legged man can be made into a sprinter. The capacity just isn't there. Second, because much money is thus diverted from thousands of boys and girls who are brimful of music—often unknown either to themselves or to their parents—and who would profit immeasurably by a musical education.

A third element in this tragic situation is that exact methods for measuring the musical talent which every human being may possess have been in existence for more than twenty years! They cost practically nothing, they are now universally available on phonograph records, and they will within an hour's time give you a strong indication, even when given by yourself, whether it will pay you or your child to spend time and money on musical education; and when given by an expert and properly interpreted they are well-nigh infallible.

The story of the discovery and development of these musical tests is one of the most fascinating chapters in our whole educational history. Before relating this story, however, let us see just what these music tests might do for your children and for your school.

In an Iowa public school, for example, there were two little girls, Jean and Viola. Jean's parents were poor, and Viola's parents were well-to-do. They were the same age, thirteen years old, and in the same class in school.

Everybody knew that Viola was musical. Why shouldn't she be? Her wealthy parents had given her every musical advantage. At the time of which I

speak she was to appear in a music recital before the whole school the following Friday afternoon.

Everybody knew that little Jean was not very musical. Her parents had told her this and she believed it. Her teacher said she was not especially musical, although she admitted that Jean sang well with the other children.

Like millions of other children, Jean was starting out in life with the big soul inside of her unknown.

One day the schoolroom door suddenly opened and a man walked in carrying a package of tuning-forks and other curious-looking instruments. The teacher said he was a psychologist and was going to test the musical ability of the pupils. And so for an hour they all had great fun trying to see which one could hear the best, which one could detect the smallest changes of pitch, rhythm and intensity, and who had the best musical memory, musical imagery and the like.

When his measurements were finished this psychologist, Prof. Carl E. Seashore of the University of Iowa, was able to tell the parents and school authorities more about the exact musical talents of every child in that room than the teachers and parents and even the children themselves had been able to tell. He told many of the children more than they ever would have discovered about themselves in a lifetime.

Some of these children who, according to teachers and parents, rated very low in musical talent, the psychologist found rated very high; others who had been rated very high he found had very little talent for music. He found little Jean had just as much natural musical ability as Viola, notwithstanding Viola's years of practise and instruction. The child was teeming with musical talent and did not know it herself. Indeed, her measurements were so astonishingly high that the Women's Club of the city was willing to raise

enough money to provide for her musical education.

Now, you may have a little Jean in your home and not know it. You may also have a little Johnny and Alice who are not musical—and yet you are torturing their little bodies and minds trying to hammer music into their unmusical heads and fingers, just because neighbor Brown is giving his children “every musical advantage.”

Would it not, then, be a blessing if this psychologist could come into your home or school and test your children and also test you and the teachers as well? I am writing this chapter solely to tell you that this is now quite possible.

Professor Seashore can now come, not in person, of course, but with his phonograph records, into every home and school in America and measure the basic musical capacities of every member of the family from grandpa and grandma down to the baby five years old. I shall tell you in a moment about these phonograph records and how to use them. They are not quite so good as having Professor Seashore there himself but they will give you a very just idea as to how much music nature has put into you.

The basic natural talents for music of every man, woman and child in America could be measured in one day, if necessary. It would cost only a few pennies per person. And it would have three results: First, it would discover great numbers of unsuspected natural-born musicians. Second, it would save all the little Alices and the unmusical Johnnies and Marys from years of criminal torture. And, third, it would enable the unmusical children to save those precious hours of time and energy which every boy and girl needs in order to develop the other talents they all possess in a happy and fruitful direction. The whole process would thus save millions in money.

I went to Iowa University to talk with Professor Seashore about his musical tests. He is head of the Department of Psychology, dean of the Graduate School and one of the most productive psychologists in the world. I found also that, hale and hearty at sixty, he plays a remarkably good game of golf.

For more than a generation the dean has been in the front ranks of many of the great new movements in psychology, such as the invention of laboratory methods and instruments, clinical psychology, mental testing, psychology of art and music and educational psychology. Of late years he has rendered no little service to American education as chairman of what is known as "The Gifted Student Project" of the National Research Council—a plan for giving the more gifted students in our colleges and universities better opportunities for full development.

Naturally the first question I asked Professor Seashore was how he came to invent these wonderful methods for measuring musical talent.

"Well," he replied, "thirty years ago I had a young colleague named Van ———, who was a well-known violinist. He was always boasting about what a wonderful ear he had for music. One day I said: 'Van, I'm going to find out just how good a musical ear you really have.' So I sat up nights for some time, devising a method for measuring sensitiveness to tone. It consisted of tests with a series of tuning-forks.

"I found by these that Van could hear a difference of eight-tenths of one vibration at A-International pitch. I did not know whether this meant a good musical ear or a poor one. Indeed, I supposed it was about average. But my curiosity was roused, and I tried my tuning-forks on a class of thirty students.

"To my astonishment, I found two important things. First, I found these students ranged in ability to dis-

tinguish pitch from one-half of one vibration to thirty vibrations. A few could distinguish finer differences than one-fiftieth of a tone, others could not distinguish an entire half-tone.

“We have since found that some persons have two hundred times as high ability in distinguishing pitch as others. Think then of giving everybody the same musical education!

“The second thing I found was that the brightest student in the class was the poorest in his sense of pitch. That raised this question: Is there any relationship between intelligence and sense of pitch?

“In order to answer this question we selected the brightest and the dullest students and found there is no relationship between one’s intellectual ability and his sensitiveness to musical tone.

“Do not jump to the conclusion that intelligence is not an aid to musical appreciation and performance. To be a great musician or composer one must have high intelligence. However, some morons are musical prodigies as mere performers on the violin, piano and the like, simply because they have an extraordinarily fine sense of pitch. This is because the sense of pitch depends upon the delicacy of the structure of the inner ear, and this is not related to the structure of the brain.

“Having found, therefore, that stupid people are just as likely to have a fine sense of pitch as brilliant people, I next asked this question: Do older people have any finer sense of pitch than younger people? Thousands of experiments have proved that age makes no difference. Children of five can distinguish differences in pitch as well as adults of fifty-five. This has certainly been a great surprise.

“Indeed, this discovery led me next to ask an even more important question: Can you improve the sense of pitch by musical education?

“Well, I took thirty children in the eighth grade and for thirty days gave them a great deal of intensive training in hearing fine differences in pitch. I then tested them again and found they had not improved a particle after the first reliable test.

“After years of experimentation, however, we can now say positively that your natural-born sense of pitch does not improve with *any amount of musical training*.

“My former pupil, Dr. Hazel M. Stanton, now psychologist of the Eastman School of Music at Rochester, New York, has tested pupils for pitch when they entered the school and tested them again after four years of the hardest kind of musical training, and on the whole there is no evidence of improvement in the sense of pitch. I measured my own children at the age of five and have also tested them in the school and university, and their sense of pitch remains the same.

“So you see that Van’s bragging about his good musical ear led me to three discoveries: First, that you can measure the sense of pitch with absolute accuracy and compare everybody with a certain definite standard; second, that the sense of pitch does not vary with intelligence, age or education; and, third, that there is an enormous difference, ranging from one to two hundred, in individuals in their sense of pitch.

“We spent two years working on the sense of pitch alone. Then we took up one element of the musical mind after the other and measured them in the same way. For twenty-five years my students and I have been at this work of building up a sound psychology of music. A great deal of this work is described so that I think any intelligent person can understand it in my book entitled, *The Psychology of Musical Talent*. There are still many fascinating research problems upon which we are working.

"We have especially measured and established standards for the six most basic musical elements. These are pitch, time or rhythm, musical memory, musical imagery, sense of harmony and discord, which we call consonance, and sensitiveness to loudness and softness, which we call intensity.

"The three great tap roots of musical talent, however, are pitch, intensity and the sense of rhythm or time. It is curious to find that there is no more relationship between any one of these and the other two than there is between, say, red hair and a big or little nose. Some people rank high in pitch and low in time and intensity; some rank high in time and low in intensity and pitch, and so on."

At this point I inquired: "What do you get out of these three fundamental tap roots of music?"

"From pitch we get melody, harmony, timbre. From intensity we get accent in rhythm and expression. From the sense of time we get tempo and rhythm.

"The sense of rhythm is not a simple sensation, such as pitch and intensity. Rhythm literally involves the whole body in a responsiveness to measured intervals of time and tone. One who has a rich sense of rhythm may, even in eating soup, feel the various movements divided into measures with their artistic grouping of long interval and short interval, with occasional cadences. Some people in eating soup certainly lack sensitiveness to loudness.

"Rhythm is a conspicuous feature of your personality. It gives you a feeling of power. It makes you feel like a dream of flying; as though you could lift yourself by your boot straps. You always feel yourself *acting* in rhythm; you feel as if you were being carried by your own action. You see this in dancing or in soldiers marching. If carried to an extreme, as

in some savage and religious dances, it produces a kind of ecstasy. It is essentially a resonance of the whole organism and affects circulation, respiration and all the body secretions in such a way as to arouse a feeling of pleasure.

"But the prime thing is that with all its complexity the sense of rhythm and natural capacity for performing in rhythm can be measured. You can tell a child or an adult how much rhythm each one possesses, and this natural capacity does not improve with any amount of training."

"Well," I remarked with astonishment, "if you can not improve your fundamental sense of pitch, intensity and rhythm, what is it that happens to us when we say we improve in music or in musical appreciation? Just yesterday a music teacher said to me vehemently, 'Why, when little Johnny came to me he couldn't sing a note, and when he tried his best he sang off key and out of time. He had no sense of pitch or time. Now he sings well. You can't tell me. I know—I have created these things in him.'"

"Oh, yes, I hear that all the time," replied Professor Seashore. "What the teacher has done to little Johnny is this: she has taught him how to use his vocal muscles, respiration, mental attention and so forth, so as to bring his voice into harmony with the sense of pitch, intensity and time, which he already possessed. Now, musical memory and musical or auditory imagery and many other musical elements do improve wonderfully from training. Possibly rhythm sometimes slightly improves, but pitch and intensity are not improved at all by training.

"But, after all, this does not matter much. I often use this comparison: When a boy is nine or ten years old he can see as well as he ever will see. His capacity to see never improves, no matter how much he looks,

just as his sense of pitch or time never improves no matter how much he listens. But what happens? Why, the boy's capacity to understand and appreciate what he does see improves as long as he lives. This is because his mind learns to put things together—to judge light and shade and distance and color. He thus interprets what he sees, and gets its meaning. Without improving his eyesight in the least, he learns to read, shoot, play baseball and the like.

“Now, I think this is very similar to the way our musical capacity develops—we learn to put sounds, intensities, rhythms and the like together and appreciate and enjoy their meaning. It is just the same as acquiring any other skill. However, just as a boy who has poor eyesight or is color blind will never see as well as one who has good eyesight, so a person with poor musical elements will never be able to combine the infinite values and meanings of musical sounds and reach a musical appreciation that is easily obtained by a person richly endowed in these respects.

“Furthermore, a person who has high intelligence combined with fine musical sensibilities can develop an originality in inventing and handling musical themes and in expressing the numerous elements of music which is impossible to a person who has poor intelligence. But is it not a fine thing that even very stupid persons are just as likely as very bright ones to have these musical fundamentals in their make-up? While they can never become composers, it does give them a rich emotional life with their delight in musical sounds and their power to reproduce what they hear.

“Now, all this has a very practical application in every home where there are children. Every child should have the chance to develop all his power, and, you can't give a child his chance by trying to give him somebody else's chance.

“As an example of this, a minister once called on me for consultation about the musical education of his three children. He wanted me to explain why his two younger children, a boy and a girl, were progressing rapidly in music while the oldest, a daughter, was making no progress. The tests quickly explained why. The younger brother and sister were highly talented and the oldest had very little talent.

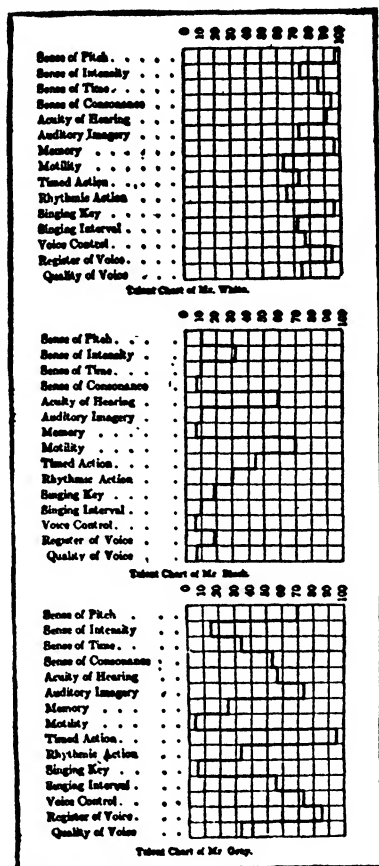
“I said, ‘Put your money on these younger children and let the oldest develop according to her other talents. She may have rich abilities of another sort.’ The mother and father replied, ‘We are not going to discriminate among our children. She needs all the more training.’

“So they sent her to an expensive eastern conservatory. It was a crime; she came out a failure. Her parents did the worst thing they could have done for her. There is nothing worse for any of us than to be literally forced to fail. And children are being tortured in this fashion everywhere just to satisfy the foolish notions or ambitions of parents.

“Of course music teachers usually think they can tell whether a child is musical or not. But they can’t. They have no exact standards.

“Let us study the music charts of three men, whom we shall call White, Black and Gray. We call these charts musical patterns or profiles. We have thousands of these profiles of actual persons.

“The charts (reproduced on page 315) show Black’s, Gray’s and White’s measurements in fifteen different elements of music. No teacher could possibly do that without exact measurements. We can now measure more than forty elements. Such elements combined make up what I call the musical mind. Dr. Hazel M. Stanton, one of my former pupils already referred to, has done especially fine work on the inheritance of musical talent. Some of these musical elements seem to

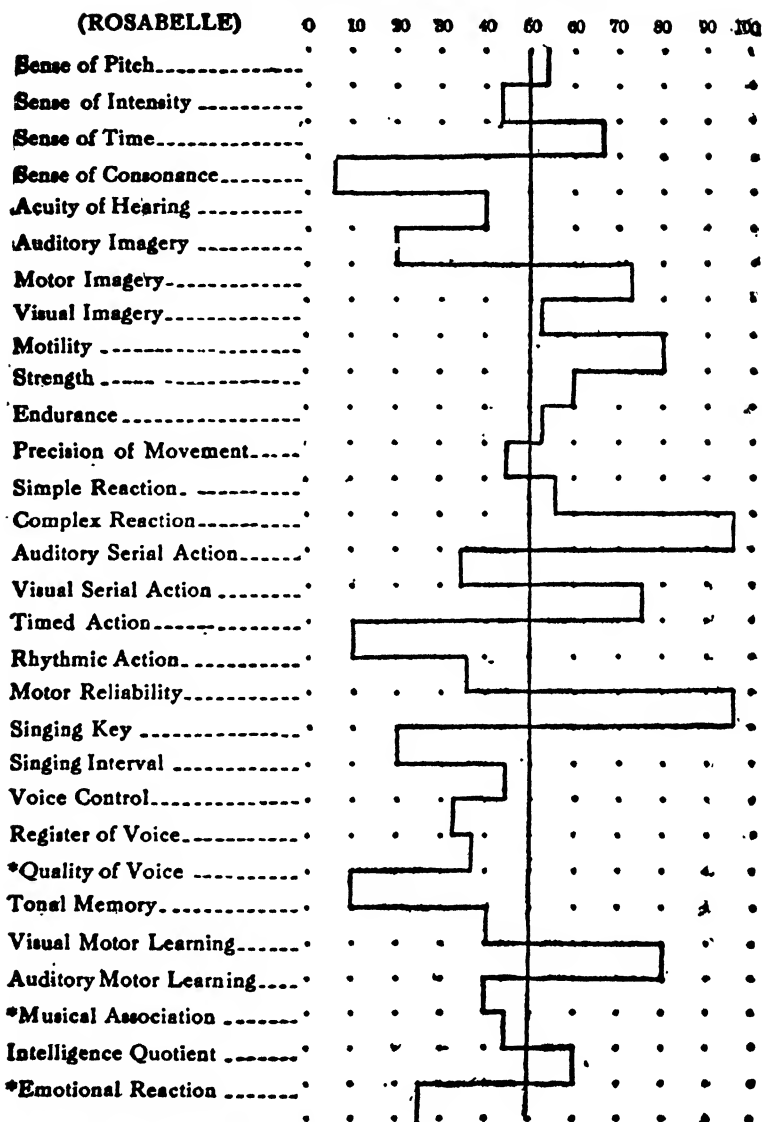


From Doctor Seashore's *The Psychology of Musical Talent*, published by Silver, Burdett and Company.

The Music profiles of Mr. White (good), Mr. Black (poor), and Mr. Gray (average).

be transmitted separately from parents to children.

"By running your eye across the top of the chart of White, Black and Gray, you will see that the scale runs from zero to 100. Zero means little or no talent, and 100 means the highest 1 per cent. of talent. Let us first note White's sense of pitch. It runs nearly across the chart, almost to 100. Black's sense of pitch runs only to 10 and Gray's extends to 70.

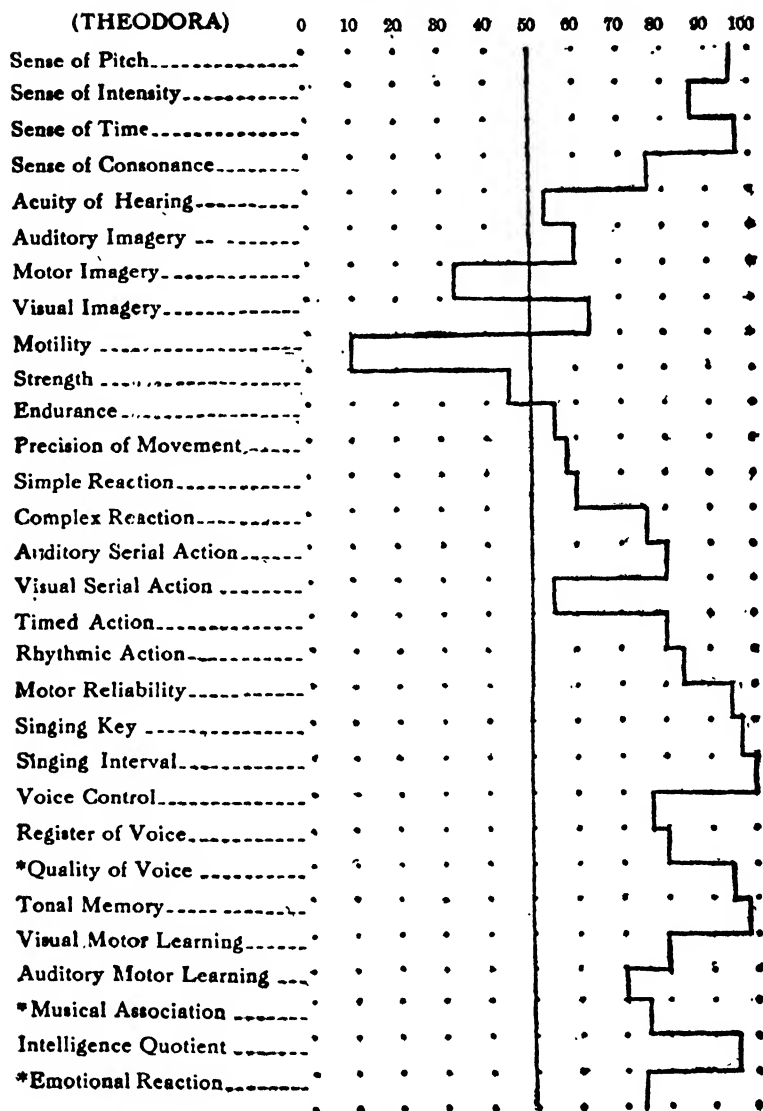


*Represent ratings, not quantitative measurements.

From Doctor Seashore's *The Psychology of Musical Talent*, published by Silver, Burdett and Company.

MUSIC CHART OF ROSABELLE

This girl isn't worth *spending* two cents to educate in music. Her sense of pitch is only 55; intensity, 42; time, 68; consonance, 7; auditory imagery, 18. She sings off key. Her general intelligence is above normal but not high in order.



*Represent ratings, not quantitative measurements.

From Doctor Seashore's *The Psychology of Musical Talent*, published by Silver, Burdett and Company.

MUSIC CHART OF THEODORA

This girl is worth educating in music. She will make a beautiful singer. Pitch, almost perfect; intensity, 88; time, nearly perfect; consonance, 78. She will never be a great performer as she is intellectual and not motor. Her enjoyment of music will be greater than her power to produce it.

“Take any other element, such as consonance. You remember that is the sense of harmony and discord. White ranks about 94 in consonance, Black about 8 and Gray 53. Gray is a good illustration of what we mean by average talent. It means high in some points offset by low in other points—not just a flat middle ability all through.

“Now, don’t you see what an immense advantage such a chart would be to parents and teachers in planning Johnny’s and Mary’s education? You see at a glance that White is very superior, Black is very inferior and Gray is about average.

“You see the same thing illustrated in two actual records of the music profiles of Rosabelle and Theodora. (See pages 316 and 317.)

“Of course if you are planning an extensive musical education for your child the tests should be given by an expert. But the phonograph records give a wonderfully accurate estimate. Sometimes a teacher will hit it right, but the tests always quickly tell the true story.

“For example, parents and teachers are often deceived by a good voice and say in such cases, ‘Mary has a beautiful voice and must have a musical education.’ They should also find out if Mary has a good ear and good musical mind to go with the voice. If not, she will likely be a failure.

“For what is more pathetic than an unmusical girl, with even a good voice, trying to sing, but singing continually off key? And what is a more real human tragedy than a good husky boy of ten or twelve or fourteen who can’t tell a symphony from a tom-tom, being compelled by ambitious parents to practise for hours each day on a violin, while at the same time you may be ruining a perfectly good mechanic, or architect, or chemist, or second baseman?

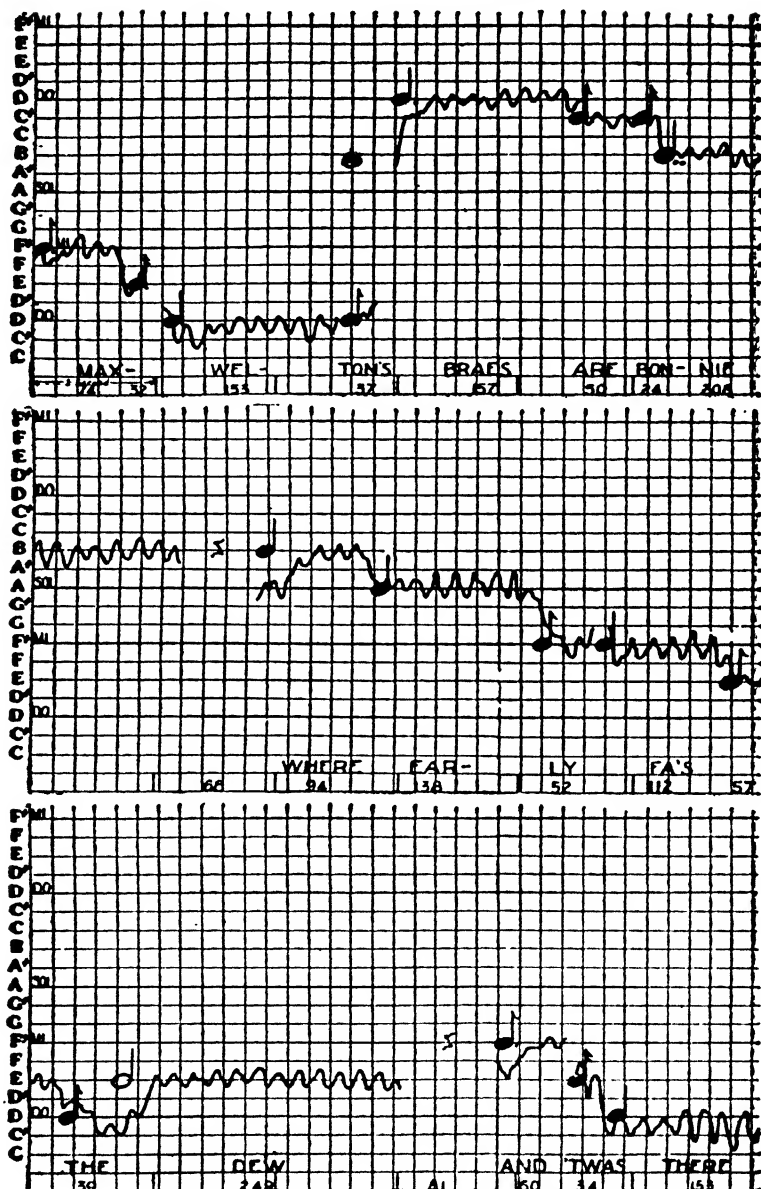
“There are now three different phases of the work

under way. The first is the use of the phonograph records not only in schools and homes, but among different races over the earth. We are especially working just now on comparisons of the native musical talent of such remote peoples as the natives of Lapland, Jamaica, South Africa, Honolulu and the Fiji Islands.

"The second is our educational-guidance program for those who are thinking of a musical career. When a youth is to spend ten thousand dollars or twenty thousand dollars on a musical education and stake his professional life upon it, it is of the utmost importance that an inventory be made by the most rigorous scientific procedure of his natural fortes and faults. We hope that stations like this one at the University of Iowa, at which reliable professional advice may be given, will be located in all the leading musical centers of the country.

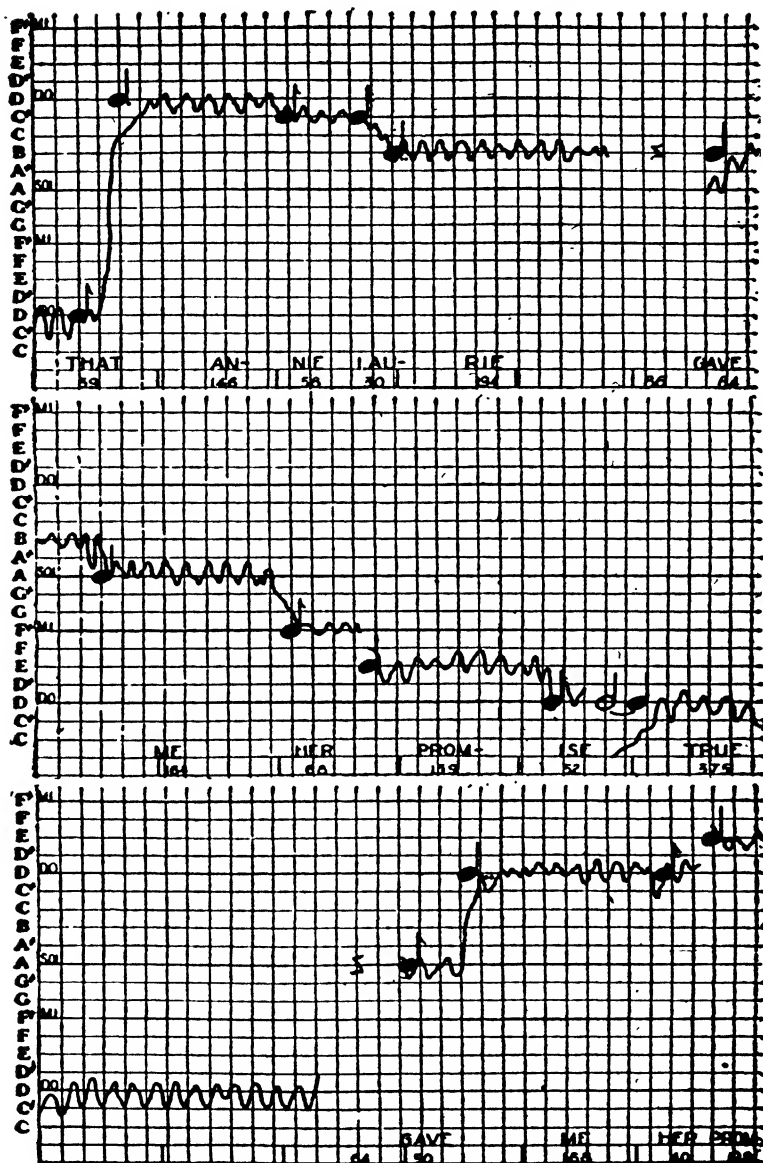
"The third feature of our program is further research into the nature of the laws of music and the more effective training of musical talent. Just now the most fascinating part of this program is measuring the expression of musical emotion. This rests upon the assumption that everything the singer or player gives out is carried on sound waves. Now, these sound waves can be photographed, and from these photographs we can see every detail of the singing to a much finer degree than the most musical ear can ever hear.

"As an illustration of such measurement is the vibrato, which is a very delicate oscillation of the voice which gives it tenderness and richness of tone. Here is a photograph of a part of the song *Annie Laurie*, which shows every variation of pitch and time. (See pages 320 and 321.) If you will bear in mind that each space up or down indicates a half-tone, you will see



From Doctor Seashore's *The Psychology of Musical Talent*, published by Silver, Burdett and Company.

This is a photograph of a part of the song *Annie Laurie*, as sung by Lowell Welles. Compare also the word "and" from the twelfth measure of this song as sung by Welles and eleven other vocal artists.



All these photographic records were made in the Psychological Laboratory at the State University of Iowa by Dean C. E. Seashore and Dr. Milton Metfessel. Reproduced by permission.
(Note each space up and down represents a half-tone and the numbers at the bottom of each graph are in terms of hundredths of a standard quarter-note of tempo used.)

that the pitch oscillates around the true tone from a quarter- to a half-tone. This is what is called the vibrato.

“To show that this is the characteristic of all good singers just note in the accompanying illustration, page 323, a comparison of the single word ‘and’ in *Annie Laurie* by twelve different singers. You see they all have this vibrato. Now, this discovery brings up a number of questions of great importance. For instance, is this vibrato desirable? What kind of vibrato is desirable? Is vibrato inborn or acquired? Can it be modified by training? How does vibrato vary with different emotions? How does it vary with the temperament of the singer? And so on. These and scores of other questions about singing have now been answered in our laboratories and will be published.

“Dr. Milton Metfessel and I have recently made motion pictures of the singing of ignorant negroes in the southern corn-fields. Our motion-picture camera was concealed in a suitcase. Here is a photograph of the song entitled *The Blues*. (Here the dean showed me a photograph similar to that of *Annie Laurie* on page 323.) It was very well sung by an utterly untutored negro. The singers usually have to work themselves up to the proper ecstasy. Our highly detailed photographs of these native spirituals make many of the so-called negro spirituals given on the stage seem like caricatures. This photograph of *The Blues* shows that it is rich with this element of beauty that we call the vibrato.

“Music schools, as well as parents and teachers, should welcome these tests as a great aid. For example, when it was announced at the Eastman School in Rochester, New York, that music tests would be given and only those who rated high would be admitted, more pupils applied than ever.

BISPHAM

WELLES

McCORMACK

BAKER

MILLER

HOMER

FARRAR

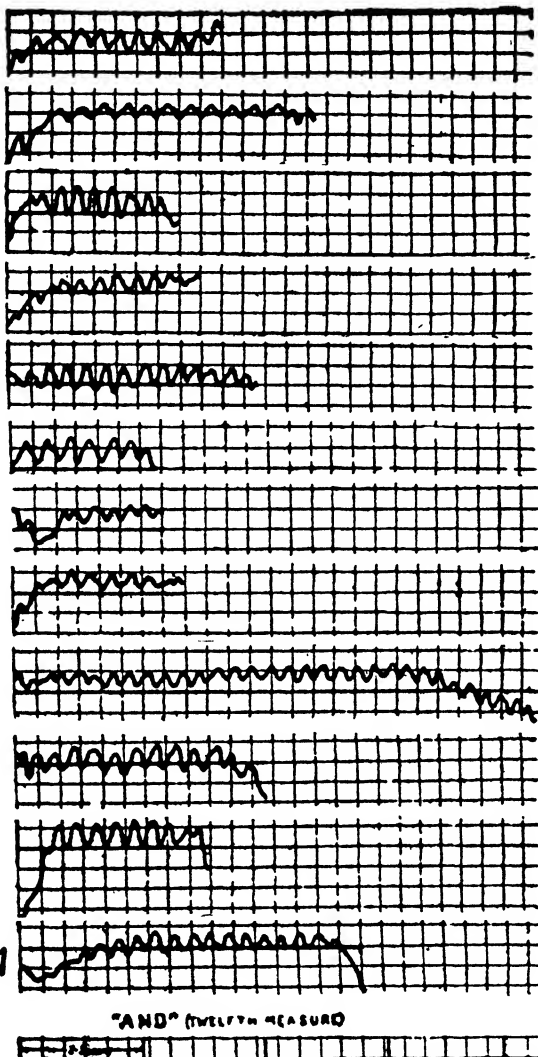
NORDICA

CASE

NIELSON

MELBA

LASHANSKA



From Doctor Seashore's *The Psychology of Musical Talent*, published by Silver, Burdett and Company.

This is a photograph of the word "and" from *Annie Laurie* as sung by twelve great singers. The word occurs in the twelfth measure, the passage running:

"And for bonnie Annie Laurie,
I'd lay me doon and dee."

Singers are astonished to see the wide variation they exhibit when they sing the same note, or think they do. The camera is far finer in its records than the human ear.

“Nearly every one is eager to know just how much music he has in him. Most persons are sensible and do not want to waste their time and money unless there is a good chance of success. The happy result of the tests was that they discovered a great many students who had high ability and great promise but were unaware of it.

“The result in every music school where only highest pupils are admitted is a very happy one, because not only more pupils apply, so that the school is amply filled, but pupils of high ability mostly remain until graduation. The curse of every school is the poor student who drops out discouraged and marked for life as a failure. But good students raise the whole tone and spirit of the school.

“A few years ago I hit upon the idea of putting the most important tests on phonograph records, namely, those for pitch, time, intensity, consonance, tonal memory and rhythm. The Columbia Company supply these at a cost of one dollar and twenty-five cents for a double-disk record. A booklet of instructions goes with the records. Doctor Kwalwasser of our department has recently made two records also for the Victor Company. These two records give the tests for sense of melody and sense of harmony. Since these records are educational and scientific, there is no profit in them. One set will do for a number of families or for a good-sized school. They can be purchased anywhere through a dealer in phonograph records.

“The records make a great game for a neighborhood evening party. Parents often gather the neighborhood children in for a number of evenings and play a different game each evening. The first night they may play the rhythm game, the next night the memory game, the next night the melody game, and so on. Mother and father and grandma can all take part.

“The thing is that you can find out for yourself just how true these measurements are. You can test yourself or your children as often as you like. The records often discover unsuspected talent. They also often prove the absence of talent and save an unmusical child from months or years of torture.

“They also show that the slum district is as talented in music as the aristocratic. All the musical talent is not located on the Avenue, and all the dull ears are not located in the tenements. They tell you also where to begin in improving your own musical appreciation.

“Many of the musical elements can be greatly brought up by training. Musical memory and musical imagery are improvable. And, while the three fundamentals—pitch, rhythm and intensity—are not improvable, yet the combinations of them with one another and with musical memory, imagery and the like can be greatly strengthened. This improves your musical appreciation.

“The tests do not discourage the teaching of appreciation, but they do enable us to put our money, time and effort where they will count for the highest happiness and success of the individual and the greatest musical development of the country. Indeed, these music tests are just one more aid in carrying out the aim of all psychology and all education, which is to give every human being his rightful chance to develop in his personality all his inborn powers for enjoyment and service.”

When I bade good-by to Professor Seashore I told him that if I ever got rich I was going to send a set of his music test records to every community in America as a memorial to my childhood playmate, little Alice.

CHAPTER XIV

PSYCHOLOGY IN RETROSPECT AND PROSPECT

DR. J. McKEEN CATTELL has been aptly called "the watch-dog of American science." In his capacity as editor of four scientific journals, namely, *Science*, *School and Society*, *The Scientific Monthly*, and *The American Naturalist*, besides his numerous other scientific connections, he has had peculiar opportunity not only to know the advances in many lines of science but to aid enormously in the organization of scientific knowledge and undertakings. Born in Pennsylvania in 1860, he was graduated from Lafayette College in 1880, and during the following half-dozen years studied at Göttingen, Leipzig, Paris, Geneva and Johns Hopkins, receiving his Doctor's Degree at Leipzig in 1886. He later received other scientific degrees and was professor of psychology in the University of Pennsylvania and Columbia University from 1888 to 1917, being the first full professor of psychology in the world. Doctor Cattell has, therefore, had the unique experience of living through the whole history of experimental psychology, and has profoundly influenced its development. During these years he has been loaded with scientific honors too numerous to chronicle here, a few of them being President of the American Association for the Advancement of Science, the American Psychological Association, the Psychological Corporation, the New York Academy of Sciences, the Ninth International Congress of Psychology and the American Society of Naturalists.

XIV

It is just a bit appalling to discover that there are only about six hundred psychologists in the United States, and probably less than fifteen hundred in the whole world. It might even be alarming if everybody realized fully what it meant. Psychology is the science of mind, what it is and how it works. When applied to human life it becomes the science of managing the mind in the best possible way.

The disquieting feature is that men never stood in such need of exact knowledge of their own minds as they do to-day. In the first place, a man to-day comes in contact with a hundred, a thousand, or even a million minds, where our fathers and grandfathers came into contact with one. If he is going to behave in the best way both for his own good and that of others, he has to adjust his mind to all these other minds. The strain of mental adjustment was never anything like so great. One wonders, sometimes, if the nerves and mental machinery of mankind will not break down.

Furthermore, the inventors who know about physics and chemistry have placed in men's hands intricate and dangerous machinery which requires the highest training of the mind to manage; mismanagement of it is likely to spread destruction, disease and death. Often one group of people fails to understand the minds of another group and takes these instruments of science and makes war upon a scale of which our fathers never dreamed. War is almost entirely due to the fact that one group of minds misunderstands another group of minds, in short, to the lack of an exact science of mind, or psychology.

As if this were not enough to call for thousands, or even hundreds of thousands of psychologists to explore the mind and find out how it can be made to work in the best way, the other sciences have opened up thousands of occupations, many of them strange and harrowing in their mental demands, in which men must spend their lives. One man is happy and effective in one of these occupations and unhappy, even dangerous to himself and society, in another. This whole situation is something new in history.

Above all this, these multitudinous occupations, which determine men's lives, call for the selection of the right sort of leaders, managers, superintendents, with special mental, temperamental and physical equipment, something never called for before to such an extent. And when all this is said, there must be teachers selected and trained by the thousands and millions, not only to teach these occupations, but to teach the social sentiments, the industrial and economic ideals, the social cooperativeness, that are all absolutely essential in order to make the gigantic machine work for human benefit instead of for human destruction.

Think, then, of only six hundred psychologists being confronted with such a colossal task! It becomes even more disconcerting when we learn that many of these psychologists can devote only a small portion of their time to psychology, and that even when they do they often have no money with which to carry out investigations or applications of the knowledge they already have that would probably double the wealth and add immensely to the happiness of the whole world. Many of these psychologists are forced to devote a large part of their time and energies to teaching, instead of exploring and learning, or in serving on faculty committees, or handling problems of student discipline,

even making journeys to decide what sort of bricks should be used in building the college gymnasium, or the color of the paint on the dormitory! Our financiers are probably losing many times as much money every year by their failure to finance psychology on a large scale as they are from strikes and labor disputes.

In view of this vast new human situation, this new demand for an exact science of the mind, this new necessity that men should know how to behave more effectively, it seems peculiarly appropriate in a volume such as this to include an interview with the first professor of psychology the world ever had. You may imagine from this remark that I have gone back in spirit to interview Plato, or Aristotle, or even Solomon. True, these men talked about the mind. They also talked about immortality and knew about as much about one as they did about the other. Psychology, as a science of number and measurement,—the two things that make a body of observations into a science,—is a modern enterprise. It was in 1887, at the University of Pennsylvania, that Dr. J. McKeen Cattell, was appointed the first full professor of psychology in any institution in the world. Of course, there were other men at that time who were studying and teaching psychology in a scientific way, but they also had other duties, such as teaching philosophy, or “moral science,” and even teaching language and rhetoric, as some of them still have to do.

Doctor Cattell has, therefore, had a box seat at the psychological drama almost from its beginning. He has seen the drama grow well-nigh from the old-time miracle play of metaphysical speculation, cobweb-spinning and wonder-working, into a sound experimental science based upon number and measurement. He has not only been one of the leading stage managers, as well as impresarios, of his time, but has writ-

ten the leading parts of many of the plays. I urged Doctor Cattell, as a matter of great historic interest, to talk to me freely about his own part in the drama, and to give me any general observations that might come to his mind about the growth and significance of modern psychology.

Doctor Cattell lighted his cigar and, as he watched the smoke curling toward the ceiling in his office, he seemed to be looking back reminiscently through the long series of developments that psychology has made during his more than forty years of fruitful service in this field.

"Our most original ideas probably come to us in our early twenties," he began. "I wish we knew more about the curve along which our ability to learn and judge moves as the years go by. If men are to be retired as college professors or army officers or what-not at sixty-five it should not be sixty-five on the calendar, but the physical and mental age of sixty-five. Some men at sixty-five are really younger than others at sixty, and some are older than others at twenty. I am now sixty-seven, and"—with a twinkle in his eye—"of course, I hope that we would find that the highest peak of good judgment is reached at that age, or some years later. Nearly every one will admit that he has a poor memory, but few of us will admit that we have poor judgment. Yet, no doubt, both of these abilities proceed along pretty definite curves of improvement and decline which could be accurately plotted out and measured. I have kept records on myself in a number of lines for three hundred sixty-five days a year for more than forty years. If we had a large number of such records, I think they would be of great scientific value; but even if not, you will find it is a very fine thing to keep exact records of your daily achievements—practise curves, we call them—in chess, bil-

liards, golf, tennis, writing, language learning and other performances.

“For example, it has been found by experiment that a child will learn more by working just as hard as he can for a short time than by dawdling for a couple of hours. And, if either a child or an adult plots out his record for each period of practise it is a good way to make him eager to exceed himself.

“To show how even so simple a discovery as to how the mind works may be made of direct value, we let most children go on through high school, say, to the age of eighteen, writing out their exercises in long hand. Yet, experiments have shown that if a boy of only ten writes on a typewriter by proper methods, only twenty minutes a day for sixty days, and carefully plots the amount accomplished each day, and also makes a plot of all his errors, even in that short time he will learn to write faster than any one can possibly write in long hand by laboring a lifetime. In addition, by learning in this scientific way on the typewriter, it greatly aids him in learning to spell and to correct his own mistakes; he also learns a good deal of arithmetic and geometry by this method without any additional effort; and, besides this, he learns something that I regard of immense importance in coming to correct conclusions and in developing wise behavior all through life, namely, the value of measuring his own performances, his own judgments and mistakes by exact objective methods. I know of no better scientific discipline, and perhaps we may say moral discipline as well, than to learn to measure by exact methods the success and failure, the correctness and incorrectness, of our own performances and opinions.

“I think the fact that so few people have learned this simple habit is one reason why we get such wide differences of opinion from people who have been

through the same experience or have witnessed the same event. Ordinary observation, recollection and general information, are more defective than is commonly supposed.

“In 1896, I published a study that I had made on one of my classes in psychology along this line. I had my students answer a great many questions, allowing thirty seconds for each reply. One question was, ‘State what kind of weather we had a week ago to-day.’ Sixteen students said, ‘clear,’ twelve said, ‘rain,’ seven said, ‘snow,’ nine said, ‘stormy,’ six said ‘cloudy,’ while six said, ‘partly stormy and partly clear.’ When asked which way the seeds in an apple point, twenty-four said, ‘upward,’ thirteen, ‘downward,’ eighteen, ‘toward the center,’ and three, ‘outward.’ These people had probably eaten apples all their lives. When asked as to the date of the death of Victor Hugo, the answers ranged from 1790, to one who maintained that he was still living. I tested them on estimating a period of thirty-five seconds. The estimates ranged from five to one hundred and fifty seconds. When they were asked what was said during the first two minutes of my lecture of a week before, well, I prefer not to give you their answers.

“This merely calls to mind the importance of exact measurements of mental operations if we are to build up a real science of psychology. It is not necessary now, of course, to argue that psychology is a science that rests upon exact experiments and measurements; nor is it necessary to prove that it is primarily concerned with the difference in behavior which different individuals manifest, and that it also can and should be applied to the promotion of human welfare and happiness. Psychologists are concerned with what people do, how they behave, rather than with what armchair philosophers may think they think.

"Yet, I look back to a time when I was the only psychologist who urged this point of view. The philosophers then told us that this sort of thing was not psychology at all. Perhaps to-day, we may ourselves be a little dogmatic in insisting that the psychology that consists of the introspection of philosophers as to how they think they think, even if true, has nothing more to do with their behavior than theology has to do with the control of the Being whose attributes it describes. Our great master, William James, gave currency to the word, 'pragmatism.' The dictionary, however, defines 'pragmatic', as 'officious, occupied with trifles'; perhaps then, it would be just as well to leave the word 'pragmatic' to be applied to philosophy! But whether we use the word pragmatic, or some other term, we do wish to make psychology a practical science of behavior. That is the only way that I see of making it a real aid in people's lives.

"I had essentially this view forty years ago and was the first to devise tests for measuring differences in the abilities, that is, differences in the behavior that people manifest. I used the phrase, 'individual differences,' and also the phrase, 'mental tests,' at that time to describe this work. I also at that time employed the word 'alertness,' and I still prefer it to the word 'intelligence.' Later the phrase, 'mental alertness tests,' came into use, but I think 'alertness,' alone describes what we have in mind just as well.

"'Ability' is a better word than intelligence, I think, because even the average man has a fairly clear idea of what you mean when you speak of different kinds of ability; he thinks of ability as some kind of performance that can be measured, while the word 'intelligence,' even perhaps to psychologists, brings up a vague notion of some sort of mysterious mental powers. I have always held that psychology has to do

with the conduct of an individual, what tasks he can and does perform with his abilities, rather than with his consciousness, or what he thinks he performs and how he imagines he feels about it. We are concerned more with what a person does than we are with what he thinks he thinks, feels he feels, or imagines he imagines. When we are experimenting on a human being, trying to learn something about his mind, as I said years ago, 'It is usually no more necessary for the subject to be a psychologist than it is for the vivisectioned frog to be a physiologist.'

"I believe it has been this changed point of view, namely, that psychology should chiefly concern itself with the study of conduct, what the individual does, rather than what he thinks he does, which I was the first to advocate, that has helped greatly in making psychology an experimental science. The first experimental laboratory of psychology was established by Wilhelm Wundt, at Leipzig, in 1879. The first laboratory courses for students were conducted by me in 1887 and 1888, at the University of Cambridge, the University of Pennsylvania and Bryn Mawr College. In 1881, I worked with Wundt at Leipzig. He was professor of philosophy, and held the theory that even if you experiment on the mind, your chief object is to set up conditions that will enable the person experimented on to tell better what is going on in his own consciousness; that is, your object is to improve the conditions of introspection, so that the psychologist can better inspect his own mind. For this reason, he thought that only a trained psychologist who could watch his own consciousness better and report more accurately what he thought he thought during the experiment, was the only person from whom much could be learned.

"I was led, however, to adopt the point of view that

psychology, on the one side, should be concerned with conduct as well as with consciousness. I concluded that we could experiment directly upon behavior and arrive at measurable results and devise useful applications. On the other side, I was led to adopt the belief that the differences among individuals, the different ways that human beings respond to the same stimulus, and the way the same individual responds to different stimuli, are of primary importance, both for a constructive science of psychology, and for its application to practical affairs.

“In order to support these general points of view, I made a great many thousand experiments upon individuals and published them in various papers in 1885, 1887 and 1889. These experiments measured the association of ideas in a way similar to our present intelligence tests. The subjects included the students of a German gymnasium, a London school, a Dublin school and Bryn Mawr College. These experiments were published some ten years earlier than any other experiments of the intelligence-test type and twenty years before the Binet intelligence tests. I experimented on the rate at which different students could read and how the rate of reading depended upon the way the reading matter was presented. I may now say without indiscretion, perhaps, that John Dewey, now the famous philosopher, and then my fellow student, stood highest in the group tested. You might be interested in the results of some of these experiments.

“For example, I found it took in the neighborhood of half a second to see and name a word, and that it took slightly longer to see and name a single letter than it does a whole word. I found that we ordinarily read words as wholes, and that the child should learn to read in that way. This was quite a new conception. If you show a person a series of unrelated words at

the same time, he can read them aloud twice as quickly per word as if you show him a single word and he has to pronounce it; words that make sentences can be read about four times as quickly as single unrelated words.

“Talking and reading are among the most human of occupations in which a large part of our lives is spent. The rate at which you can talk and read measures the length of your life more correctly than any calendar; for if you can think and act twice as rapidly as another man, you live just twice as long in the same number of years. I found there were great differences in individuals in these respects.

“For example, if a series of letters or words is shown so that two or more are in view at the same time, they can be read more rapidly than if they are presented singly. The speed increases until three letters are in view for some people, while for others the speed increases until five letters are in view. I thus measured the complexity of the impressions that can be grasped by different individuals at one time. That is, some individuals I found could hold three letters in the focus of consciousness while others could hold five. I found, further, that individuals can perceive and remember five times as many letters when they form words and sentences as when they are disconnected. But I found among normal persons who had about the same training, that some were twice as efficient in this performance as others. I found that men engaged in manual work were much inferior in this performance. There was no difference between those who spoke English and those who spoke German, as I made tests in both languages; I found women were slightly superior to men. I also studied the relationship of age and conditions of health to efficiency in these performances.

“The point of interest is that I was measuring dif-

ferences in the ability of individuals by exact methods, and this was the first work of that kind that had been done. Of course, it had been recognized that individuals differed from one another from the beginning—to be a fundamentalist for the moment—from the sex differences between Adam and Eve, and the character differences between Cain and Abel. The ancient Greek doctor, Galen, you may remember, defined four types of temperament that characterized different individuals, namely, the choleric, sanguine, melancholic and phlegmatic; modern physiology still holds that these types have some basis in fact. I still believe the most important work for psychology and its most useful applications are the measurement of the differences among individuals, groups and races, and the determination of the extent to which these differences are due to native endowment or to subsequent experience, that is, to heredity or environment.

“I think it might well be argued that the most important problem in the world to-day is the measurement of each person’s ability, and the determination to what extent these abilities are inborn and to what extent they may be improved by education. For instance, if every person from the moron to the President of the United States could be selected by exact measurement of his temperament and abilities for the work that he can do best, and if the work could be fitted in the best way to each individual, and the best possible training for his special work be given to him, surely the wealth of the nation could be more than doubled, and the happiness of every citizen would be correspondingly increased. If, on the other hand, society could be so organized that only the children of the highest health, ability and character were born, then the wealth and happiness of the world would not only be doubled, but would, in all probability, be ad-

vanced beyond the reach of practical imagination.

"From this point of view, psychology has two very great functions to perform as its ideal: the first is the measurement of the abilities of each individual so that we may devise methods of training those abilities to the highest degree of efficiency. Psychology may as a second ideal function also aid ultimately in devising those methods of social engineering whereby better children may be born. I had those two ideals in mind when, in my presidential address, in 1896, to the recently established American Psychological Association, I said: 'We not only hold the clay in our hands to mold to honor or to dishonor, but we also have the ultimate decision as to what material we shall use. The physicist can turn his pig-iron into steel, and so can we ours; but he can not alter the quantities of gold and iron in his world, whereas we can in ours. Our responsibility is indeed, very great.' "

At this point I interrupted Doctor Cattell with the request that he give us a little clearer idea as to how such an apparently vague and undefinable thing as intelligence, or mind, can be reduced to measurement. "How," I said, "do you set about measuring the mind? Most people think of mind as an unweighable, unmeasurable, ethereal something that can not be taken into a laboratory and measured and weighed as we measure and weigh other forces and objects in nature."

"As I have already intimated, that was the general view among scientific men when I began to study psychology, and, of course, that is still the view of a great many quite intelligent people, who are either uninformed or misinformed. Formerly when I met some casual acquaintance and he discovered I was a psychologist, he most frequently inquired what I thought about mediums, spirits, ghosts, clairvoyance, telepathy, and what even to-day usually goes under the name of

psychical research. He usually continued the conversation by telling me of his own remarkable experience. People still often relate instances that to them prove communication between minds at a distance, the 'proofs' being usually what, to a scientist, are merely rather amusing coincidences.

"Nowadays, however, the more usual topic for after-dinner conversation is psychoanalysis. As a matter of fact, witches in New England were convicted on better evidence than can now be brought forward to prove any supernormal event; the 'miracles' at Lourdes have better proof behind them than have any of the queer experiences of Sir Oliver Lodge, or Sir Conan Doyle. As to psychoanalysis, it is not so much a question of science as a matter of taste, as Doctor Freud is an artist, rather than scientist, who lives in a fairy-land of dreams among the ogres of perverted sex. In reference to such things as applied hypnotism, suggestion and psychoanalysis, I think we might here appropriately repeat the remark attributed to Benjamin Franklin: 'There is a great deal of difference between a good physician and a poor physician, but not much difference between a good physician and no physician.'

"As to how we proceed in measuring features or activities of mind, I found in my early experiments that if one lifts his hand as soon as he hears a sound, the interval elapsing between the sound and the movement will be in the neighborhood of one-seventh of a second. This is what we term the reaction time. It seemed desirable to reduce all such measurements to thousandths of a second in order to have a short regular unit of measurement and comparison. For convenience I termed this unit of one-thousandth of a second a 'sigma,' using the Greek letter for sigma in place of the cumbersome phrase, 'one-thousandth of a second.' This term has come into quite wide use not only in psychology but in other sciences.

"In this way, when we speak of the reaction time of one person to one kind of stimulus, as so many sigmas, and to another kind of stimulus, as so many sigmas, we can compare the difference in the number of sigmas. You see this is quite exact measurement of mental and nervous processes. We can, in this way, readily compare the reaction time of one person with that of another, and, in a thousand ways, measure individual differences. We can measure the reaction time of the same person under different conditions, and find how his mental operations vary with fatigue, or drugs, or weather, or practise, or anything we desire.

"One thing that all this has taught us is that there is ordinarily no break in the growth of an individual from the first life cell to the matured adult; there is also no break between the one-celled organisms, such as the amœba, and the highest vertebrates, such as apes or human beings. There is, furthermore, no break between a simple reaction, such as putting on your hat, and the most complicated human behavior, such as the conquests of Napoleon or the development of the theory of relativity by Einstein."

"May I inquire," I said, "what part consciousness plays in these reactions, such, for example, as lifting your hand when you hear a sound or starting your automobile when you see a green light?"

"Well, in a reaction that has been practised a number of times, there is no consciousness, although it is true that the observer has planned the response in advance and knows after it is over what the stimulus and movement have been. In the conduct of daily life, we may foresee what we shall do and recognize what we have done; nevertheless, we do not know whether our actions are caused by consciousness or whether consciousness is only a by-product of our actions. Perhaps it does not make any difference, and is a problem

without meaning, as consciousness and conduct would be the same whether consciousness caused conduct, or conduct caused consciousness.

“The exact measurement in this way of the differences in the ability of people has great practical application. For example, if one observer can not discriminate as readily as another between red and green, or as he himself can distinguish between yellow and blue, we can readily detect this defect by the fact that in one case the reaction time is longer than in the other. It is worth noting that about one man in twenty-five, and one woman in a hundred, can not detect the difference between red and green. It is certainly worthy of serious consideration that one automobile driver out of twenty-five can not tell the red signal, which means ‘stop,’ from the green signal which means, ‘go.’

“These two colors, red and green, are probably used more extensively than any other for danger and guidance signals; therefore, it is highly important that those in charge of railways, steamboats, airplane and automobile traffic should be able correctly and promptly to discriminate between these colors. Color-blindness is inherited and permanent; it can not be cured. But we can avoid placing men and women where this defect may cause accidents; furthermore, we can, and should, adjust the colors of signals, and also use signs of distinctive shape and symbols and words that will lessen the danger. It is in general difficult to alter or improve the individual to any great extent, but we can select individuals for the work that they can do best, and we can make conditions such that the work will be done to the best advantage.

“These principles have very wide application. For example, there are seven thousand motor-car accidents every year in the United States; about ninety per

cent. of these are due to the human factor. Bearing upon the question as to what may be some elements not already noted in this human factor, it has been found that we can recognize a color, an object, or a picture, more quickly than a word, but we can name a series of words about twice as quickly as we can name a series of colors or pictures. However, young children and uneducated people can name the colors or the pictures more rapidly than the words. It has been found that the letter *E*, is the hardest to read quickly of all the capitals, and the letter *s* is the hardest to read of all the small letters, and yet, these are the letters more frequently used than any others in the alphabet. The reason they are hard to see is because they are divided into two parts. There are other letters such as *i*, *l*, *f*, *t*, that are hard to tell apart owing to their similarity; we continually mistake the one for the other. It seems foolish in printing to use forms that actually strain the eye and brain more than is necessary. Our letters have been handed down to us from the past, like much else in our civilization, and they should be adjusted to meet modern conditions. Our letters were developed largely for ease in writing, whereas, since the invention of the printing-press, we are concerned only with ease in reading.

“Another thing that makes our reading difficult, is the punctuation marks that we use. They simply mean that the eye has to see and the mind to recognize an extra symbol, when it is unnecessary and to some extent confusing. It would make reading easier and writing and printing would become more of a fine art if, instead of punctuation marks, open spaces were left equal to the pauses in reading and to the normal rate of understanding.

“All of these measurements of fine differences in human reactions have important bearing on problems

of safety, of spreading information, of the selection of employees and the like. Education and training consist largely in forming correct automatic responses to the usual situations of daily life; anything, therefore, either in our danger signals, or in printing, that will tend to make it easier for more individuals to form these automatic habit responses is of great value. They all tend toward eliminating effort and fatigue, and this gives greater freedom to the mind for other activities."

CHAPTER XV

PSYCHOLOGY IN RETROSPECT AND PROSPECT (*Concluded*)

"THE reduction of psychology to a science of measurement," Doctor Cattell continued, "has not only enabled us to measure the mere speed with which we perceive things, but has enabled us to learn a great deal as to *how* we perceive things in time and space, and to study many other features of mental activity too technical, perhaps, to discuss here. Our present-day intelligence tests, or ability tests, have been an outgrowth of this method of studying mental-processes. The Binet-Simon scale, which rates the mental performances of children in terms of their age, was first used in 1905, to diagnose subnormal children; in 1908, it was used to measure the mental age of children both normal and subnormal. Many distinguished psychologists in this country have developed and extended its usefulness, and also have devised many other mental tests of untold value in classifying children in school and in selecting men and women in industry.

"However, in 1896, I published a research entitled, *Physical and Mental Measurements of the Students of Columbia University*. This was the first series of such tests used with a large number of individuals, and still remains the most extensive undertaking of this character. The students were tested at the beginning of the freshman, and the end of the senior year, the women of Barnard College, as well as the men of Columbia College.

"Some thirty physical and mental measurements were made of about one thousand students; the measurements included such things as height, weight and lung capacity, keenness of sight, discrimination of

pitch and reaction time, memory, imagery and association of ideas. Such measurements make it possible to follow the careers of college students through life, and to measure their children and make comparisons of value that may throw light upon the problems of both heredity and environment. Later, I secured similar measurements of eminent scientists, including men as distinguished as Simon Newcomb, the mathematician, and William James, the psychologist and philosopher.

“It is highly desirable that every one should know where he stands among his fellows in important bodily and mental abilities. General estimates of character and physique are unreliable. There is, for example, no known relation between a man’s complexion or the shape of his head, or the size of his nose or chin, and any characteristics of his mind. A high ‘noble’ forehead does not prove high intellect or noble character. A powerful jaw does not prove that a man is a good fighter, or has any tendency to be bellicose. Professional fighters require strong jaws, but this is merely a part of a good fighting equipment, and not a cause of the fighting disposition. For these reasons the reading of character by the face or head or hands or color of the skin or eyes or hair is the occupation of charlatans; the same is true of the reading of character from the handwriting. It is difficult, or impossible, to tell even the sex of the individual either from the features of the face or from the handwriting. Where nothing but the face is visible, experiments have proved that males and females are often impossible to distinguish from each other. Of course, all these things are legitimate objects of scientific study, but outside of the laboratory, such things are carried on almost entirely by fakers and charlatans. When men generally learn to reduce their judgments, obser-

vations and beliefs to exact measurements, it will bring about an extraordinary change in their attitudes in religion, politics, business and all the affairs of life.

“Many years ago it seemed to me it would be eminently serviceable if we should seek, not only to measure the individuals about us, but to apply measurements to men and women and events in history. Thus, history would tend to become much more of an exact science. With this idea in mind, I made a study of the thousand most eminent men in history. By taking six French, German, English and American biographical dictionaries, or encyclopedias, I was able to determine the one thousand who had received the largest amount of space in them. Methods were devised for reducing the dictionaries to a common standard, and only those persons were included who appeared in at least three of the six dictionaries. This enabled me also to rank all these men in the order of their eminence in the world’s history, as measured by the amount of attention given to them.

“You might be interested in the rankings that this method assigned to a few men well known to every one in America. For example, Abraham Lincoln, ranks as the 40th most eminent man that ever lived; George Washington, 19th; Daniel Webster, 183rd; Charles Dickens, 152nd; Ralph Waldo Emerson, 419th; Benjamin Franklin, 45th; Benjamin Disraeli, 143rd; Goethe, 7th; Victor Hugo, 142nd; Alexander Hamilton, 216th; Thomas Carlyle, 103rd; Edmund Burke, 12th; and Robert Burns, 92nd. This does not measure their relative personal greatness, but does measure their relative fame with a considerable degree of correctness.

“According to this list the ten most eminent men are Napoleon, Shakespeare, Mahommed, Voltaire, Bacon, Aristotle, Goethe, Cæsar, Luther, Plato.

There is no doubt but that Napoleon is the most eminent man who has lived. Yet it should give us pause to think that this Titan of anarchy stands first in the thoughts of most men. It is curious that these ten preeminent men are so widely separated in race and age—two Greeks, two Frenchmen, two Germans, two Englishmen, one Roman and one Arab; two in the fifth century and one in the first century before Christ, one in the sixth, one in the fifteenth, two in the sixteenth and three in the eighteenth century.

“This method enables us to determine what periods have produced the highest number of eminent men, and what nations have been most fruitful, both in producing men of genius, and in the types of genius produced. From this study we find that in the fifteenth century, Italy, England, France and Germany had nearly the same number of eminent men. Italy was in the lead, but then fell in productivity, and so did Germany; England and France, however, rose from the fifteenth century to the eighteenth, producing nearly an equal number of distinguished men, although England surpassed France in the number of men of the highest eminence. Germany rose rapidly from about 1650 onward, and about that time America began producing men who came within the selected list of one thousand.

“It is very interesting to discover that France has excelled in war, science and scholarship, England in producing men great in politics, poetry and philosophy, Italy in producing great artists. Of the eighteen great musicians in the list, Germany has produced ten, Italy six. Of the fourteen great explorers, England has produced five, Spain four. Our school histories, at least until very recently, were devoted mainly to discussing wars and politics; yet it is interesting to discover that there have been more scientific men,

philosophers, poets, artists and the like, among these one thousand most eminent men of history than sovereigns, soldiers and statesmen. It is significant that the number of scientists has risen and the number of philosophers and men of the church declined. There have been more great scientists than great soldiers, and the relative increase of the latter may indicate a gradual cessation of war and the predominance of science.

“By the same method a list of one thousand American scientific men who died prior to 1900 has been compiled and the results show how the interest of scientists in different subjects, such as physics, chemistry, astronomy, zoology and the like has grown and changed. Indeed, this method shows that a study of history and social and political forces and interests can be studied by quantitative methods, similar to those by which we study other natural phenomena. History is controlled by economics but economics is controlled by the applications of science.

“I should like to go on into many technical discussions of the advances in psychology of which I have been a continuous witness, and in which I have played some part for the past forty years. But I should like still more at the present moment to say something to your readers about my faith in science and in its immense services both to the material and spiritual lives of men. It is some satisfaction to have been privileged to live throughout almost the whole history of my own science of psychology and perhaps this should permit me some confidence in stating what seems to me to be the office and objective of psychology and its relationship to other sciences, as well as the service of science as a whole.

“It is true that there are able psychologists who like to narrate what they think they think, what they

feel they feel, what they imagine they imagine. Those of us whose chief effort has been to make psychology a science of quantitative measurements and objective results wish them satisfaction, even though we may think, feel or imagine that such diversions are mainly literary and contribute about as much to a science of psychology as similar stories about their rheumatism and other bodily ailments would contribute to a science of disease. Hamlet said: 'There are more things in heaven and earth than are dreamt of in our philosophy.' There are certainly more things dreamed of in philosophy and in some kinds of psychology, than are in the heavens above, or in the earth beneath, or in the waters under the earth; but they do not give us a science of psychology.

"However, in spite of the limited values of direct introspection and philosophizing about how we think we think, our own personal mental life is to each one of us a part of the real world, and, of course, it is the part that is of the deepest concern to each of us. It may be, as has been suggested, that psychology long ago lost its soul and is now losing its mind; but it can not lose consciousness as some psychologists are beginning to claim that it should. Our perception, thoughts, intentions and feelings are not only elements in nervous arcs and reflexes; they are for us the end to which the whole creation moves. As far as production goes, consciousness may be only a spectator, but nevertheless, it is the ultimate consumer. We shall have in due time a scientific psychology of human welfare, a psychology of the things that are beautiful, good and true, but it will not come by talking about the laws of the mind, but by carefully and laboriously measuring mental operations and processes; we can then apply these known measurable and predictable laws of mind to human welfare; for

in the end science has no meaning or value other than in its usefulness.

“And is it not inspiring to reflect how useful science has been—the most useful thing in all the world? Within even the past one hundred fifty years science has increased fourfold the productivity of labor; it has doubled the length of human life. Science has made it possible for each to work at a routine task half as long as formerly and at the same time to consume twice as much wealth as formerly. Fourteen hours of labor in which women and children were forced to share formerly provided only hovels, lice and black bread for most people and luxuries for a very few. But now, owing entirely to science, seven hours of labor will supply comfortable homes, warm clothes and healthful food for all. If the resources provided by science were properly distributed, that is, if we had an adequate applied social and economic psychology, there is now sufficient wealth to enable all to share in the desirable luxuries that science has created, and to enjoy to the full measure of each one’s natural capacity the most nearly ultimate goods of life, namely, home, friends, things to do, freedom, self-respect.

“Science has abolished slavery, the terrible thing upon which past civilizations were mainly built; over a great part of the world it has abolished pestilence and famine. Of the three evil fates, war, pestilence and famine, only war survives from a prescientific and barbarous past. It is still true that much in the modern world is crude and ugly; instincts are atrophied, impulses aborted, and these must be replaced by the products of a science of psychology before living can become free and fine. Those who speak of science as materialistic have narrow thoughts and are themselves lacking in the idealism they so loudly

proclaim. They fail to imagine what it means in terms of love and suffering, that of ten infants born, only two or three formerly survived childhood, while to-day, through the ministrations of science, eight or nine may live to have children of their own.

“It is often said that science is not concerned with matters such as democracy, liberty and the pursuit of happiness; but I do not hesitate to say that science has been the creator of the modern world; it is a force more potent than any religion, than any system of laws, than any form of government. The advance of science is not dependent for its results on religion, law or government, whereas religious, social and political institutions are on the one side based on the truths determined by science and on the other side, on the economic conditions caused by the applications of science. No social system, no political theory and no religious creed can long be maintained when it is not in accord with science. The hope of the world is that science shall slowly gain in force and volume through the centuries and in the end bring truth and reason into all our actions and beliefs.

“And, touching finally upon the so-called conflict between science and religion, there is not and can not be, in my judgment, any conflict between the two. Religion is a fact, art is a fact, metaphysics and theology are facts; they may be beautiful or ugly, useful or harmful, but as facts of nature they are open to scientific investigation, however ignorant we may be at the present time in regard to them. For me there are no more beautiful words than the opening lines of Genesis, ‘In the beginning God created the heavens and the earth.’ But whether the story told in the first chapter of Genesis is a true account of what happened six thousand years ago and describes correctly just how God created the heavens and

the earth, is a question of fact to be investigated by the same methods that have brought us all our exact knowledge. It is absurd to try to reconcile religion and science when there can be no conflict between them. The bison had the prior possession of the prairies, but it is futile to try to reconcile the right of the bison to stand on the railway track with the right of the locomotive engine to run over the track.

“Of course, it is often asked how the scientist knows he is right; the answer is that he does not know. He makes approximations, these approximations prove useful and lead him on to other approximations which also prove useful, but he knows that the bank of his knowledge is solvent only so long as it honors his drafts. The Euclid-Newton bank honored until recently all the drafts that were drawn on it. It may be that Einstein and others have drawn drafts that it may not be able fully to honor. Very well, if this proves to be the case, then the bank will be improved, that is, our notions of the physical universe must be revised or discarded. The Darwinian bank has so far honored most of the drafts drawn upon it; when it fails to do so, it will likewise be enlarged and improved. These have all been useful banks of knowledge while they existed; they have been of incalculable service to truth. Should they be revised and enlarged or even discarded, it does not mean the bankruptcy of truth. The reserve fund of truth will still be large and will only be transferred to other banks of knowledge.

“If the theories we now have about the mind should prove to be wrong, we have at least discovered how to search for the facts of the mental life; and as these facts are found and applied it will lead us to other facts and applications with a corresponding enlargement of our lives. And if, likewise, the theories

of physics and chemistry should prove to be wrong, it will not change the fact that the methods by which the scientists arrived at their theories, have not only created our civilization, but given to it the finest art and the truest faith; they have given us practically all the wealth, education, democracy, liberty and equality of opportunity that we have. The advancement of science should, therefore, be the chief concern of everybody because the happiness and welfare of ourselves and our children depend immensely upon our exact knowledge of nature and how to apply it."

Since Doctor Cattell in the year 1922 founded the Psychological Corporation for the purpose of furnishing vocational advice and guidance, particularly to the young men and women of the country, and for making psychology serviceable to business industry and daily life, it is especially appropriate to say here that any person who may desire a psychological examination in order to help him appraise his abilities and aptitudes, can usually get in touch with a competent psychologist by writing to the Department of Psychology of the nearest college or university.

So-called psychologists who advertise their services in the newspapers are to be avoided. None of them has any professional standing, for no psychologist would advertise, any more than a physician would.

The necessary interviews and tests, if the results are to be at all reliable, require several hours. The fee for such a psychological examination naturally varies with the situation of the psychologist. It is usually about what one would pay his physician for a thorough physical examination and diagnosis. Psychologists in New York receive all the way from fifteen dollars to one hundred dollars for such an examination, with twenty-five dollars as the most common figure. The cost of a single test—for clerical

ability, vocational interest, engineering aptitude, college aptitude, etc., is sometimes less than for a more comprehensive examination; but it is unsafe to expect any reliable information from a brief test.

Some psychologists specialize in tests for adults. Others devote themselves to work with children or with students of high-school age, or with prospective music students, etc. A list of over one hundred representative psychologists who are prepared to undertake these services, together with the location of centers of psychological examining in different parts of the country has recently been compiled by the Psychological Corporation. Information regarding these various centers for psychological service may be had by writing to Dr. Walter V. Bingham, President, Psychological Corporation, 29 West Thirty-Ninth Street, New York.

CHAPTER XVI

SCIENCE MEASURES MORALS

For the past three years Drs. Hugh Hartshorne, of Teachers College, Columbia University, and Mark A. May, of Yale University, have conducted an extensive study of character education of which the following essay is a brief review.

Hugh Hartshorne, was born in Lawrence, Massachusetts, in 1885, and graduated from Amherst in 1907. In 1911 he studied at Yale Divinity School and in 1911-1913 at Union Theological Seminary and Columbia University, receiving his Doctor's Degree in education from Columbia in the latter year. He was instructor in religious education at Union Theological Seminary in 1913-1915, assistant professor, 1915-1922, and also principal of Union School of Religion, 1912-1922. He was also professor of religious education at the University of Southern California 1922-1924. Doctor Hartshorne is the author of a number of religious publications such as *Worship in the Sunday School*; *Childhood and Character*, and *Stories for Worship and How to Follow Them Up*.

Mark A. May was born at Jonesboro, Tennessee, in 1891, and graduated from Maryville College in 1911. He later studied at Chicago University and received his Doctor's Degree from Columbia University in 1917. During 1917 and 1918 he was a psychological examiner in the United States Army, and was one of the contributors to the famous Memoir XV, containing the statistics of the Army mental tests. From 1919 to 1924, Doctor May was professor of psychology at Syracuse University, and from the latter date to 1927 he was engaged with Professor Hartshorne on the Character Education Inquiry. In 1927 he was called to Yale University as professor of educational psychology. He is the author of *How to Study in College*, and, *How to Study at Home*, and of numerous technical researches.

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EVER since Adam and Eve made a moral success of one boy and a moral failure of the other, the training of children in character has been one of the chief concerns of parents. Whole libraries have been written on how to build character. Wise men of all ages have created maxims about character—many of them supposed to be direct from heaven. All the religions of the world are inspired with the ideal of character education. People have been whipped, burned, hanged, electrocuted, preached to, lectured, and subjected to every other form of torture, with a view to improving either their character or that of others who might profit by their example. Character education has always been the ultimate goal of all education.

In our day, hundreds of millions of dollars are being expended in trying to make people good. Within the past few years, organizations for teaching character to our youth have sprung up like mushrooms. Such organizations as the Boy Scouts, Girl Scouts, Junior Red Cross, Girl Reserves, Camp Fire Girls, Knighthood of Youth, and many others, as well as our Sunday-schools, have been setting up programs of moral education. They are all inspired with a well-nigh holy zeal for improving the moral behavior of their members, and their excellent results are loudly proclaimed.

Do all of these vast efforts do anybody any good? Do they make people *actually* better or worse? We are forced to make the startling confession that nobody *actually* knows.

In proof of this, let us ask ourselves a few straight-

from-the-shoulder questions to see what we really know about character education. Every parent, every sponsor and backer of these varied systems of so-called character education, every organization and individual interested in developing a true science of living, is interested in any answers that science can give to these all-important questions. It has been assumed, until recently, that the answers always would be favorable to character development.

Does the teaching of an ideal to an individual before he has himself gone through the experiences that caused the ideal to grow up in the minds of his teachers cause him to incorporate that ideal into his own behavior, or does it cause merely sentimental introversion and day-dreaming, with a resulting weakening of his character?

Does requiring a pledge promote the sense of honor or a disintegration of the sense of honor?

Does the giving of prizes and rewards for good deeds promote habits of honor and kindness, or of subterfuge and hypocrisy?

Does requiring a child to keep a record of its good deeds make it virtuous, or priggish? Or does it teach the value of successful lying?

Does rigid discipline, such as that of military schools and camps, promote self-control or dependence on external props and commands?

Does the learning of the "rules of the game" and the enforced practise of fair play in athletics make more moral citizens, or merely more self-satisfied citizens?

Nobody knows the complete answer to a single one of these and a thousand other similar questions. Yet we are spending untold millions every year in the assumption that the answers are simple and obvious, and all to our own liking, whatever our notions and

prejudices, not to mention our vested interests, about them may be.

In view of this chaotic situation, the Institute of Social and Religious Research of New York City has, within the past four years, inaugurated an extensive research in an endeavor to answer a few of these questions by the use of scientific tools and experimental methods. The entire project has been carried to its present stage by the chief investigators, Dr. Hugh Hartshorne of Teachers College, Columbia University, and Dr. Mark A. May of Yale University. They have enjoyed the intimate counsel and criticism of Prof. Edward L. Thorndike of Teachers College, Columbia University, who two decades ago took a leading part in devising, for the measurement of intelligence, tests corresponding to those which the present project is devising in the more difficult field of conduct. The investigators have been assisted by several brilliant graduate students and have had the general counsel of a group of advisers which includes well-known educators.

The research is known as "The Character Education Inquiry." The first results are just being published by the Macmillan Company. The inquiry has been extended and funds granted for a five-year instead of a three-year research, as was originally planned. The first volume is entitled *Studies in Deceit*. Other volumes will follow, dealing with other aspects of character. Every educator, social worker, parent, and minister will find these volumes fundamental source books in character education for many years to come.

The investigators decided that the most basic research they could make would be to devise methods of research. They therefore concentrated their first efforts upon devising methods and statistical instru-

ments for measuring trends in conduct, and for measuring the result of any special system for improving human behavior, or of agencies that may cause deterioration.

The first point of attack was the study of the tendencies in school children to lie, cheat and steal. Psychologists had already devised fairly successful methods for measuring the results of teaching the three *R*'s to Johnny and Mary. But when it comes to measuring whether or not Johnny and Mary are getting to be bigger liars, cheaters and thieves as they grow older, and whether this or that method of character training makes them better or worse, few measurements of much value existed when these students began.

The immediate objective was not to analyze motives and ideals, but to measure the amount of deception and the strength of the tendencies to deceive that exist in ordinary situations among children from about eight to sixteen years of age, both at home and in school. The investigators were careful not to place any special temptations before the children, and did not have in mind to catch any particular child. The idea was to measure tendencies of classes and groups. Of course they did detect the lying, cheating and stealing of each child. They then added all this together and made a combined lying, cheating and stealing score, or "honesty index," for the class as a whole. They were thus able in the end to say, "The honesty index of class 7B is 70, of class 8A is 55," and so on. These were not the exact terms and figures used, but they illustrate the results.

It is impossible to describe in detail all of the twenty-odd tests of the three types of deception measured—namely, lying, cheating and stealing—that these authors devised. The tests were given to 10,865

school children, ranging from eight to sixteen years of age, in many types of schools—public, private, progressive, old-fashioned, rich and poor. Some of the schools were in congested districts, some were attended by children mostly of foreign parentage of all types of occupation, races and nationality. A few of the schools were orphanages. Most of the schools were in the East, but some were in a mid-western city of two hundred thousand.

The detection of fraud has always been of fascinating interest, and some of the devices these investigators used for catching the deceivers are as thrilling to a student of psychology as are those of Sherlock Holmes. However, the authors had to use such highly intricate mathematical calculations in order to interpret their results it may be that the general reader, in perusing these volumes, will find, as Bill Nye, the humorist, found in reading Webster's Dictionary, that the plot is sometimes difficult to follow.

On a number of tests the problems were steeply graded in difficulty, and they found that a pupil who cheated when it took a lot of trouble to cheat, would also cheat when it was easier to do so. That is, if he cheated at a certain point of difficulty or resistance, he cheated all the way down the scale of difficulty. He did not suddenly begin to cheat at a high point of resistance. It is important to understand this in order to see clearly what the authors mean by "measuring the tendency to deceive."

Some other tests were used called the Improbable Achievement Tests. One of these, first devised by Dr. Paul F. Voelker, now President of Battle Creek College, consists of a number of small circles arranged in a large ring on a sheet of paper. The test is to take a pencil and, with eyes closed, put as many dots as possible in each one of these circles, going

around the ring in serial order. Any high degree of success is ample proof that the subject peeped.

A number of puzzles also were used as tests—puzzles that looked simple but were very difficult. The child who solved them too easily plainly cheated.

Among the tests that were in many ways the most significant were what are called the Institute of Educational Research Achievement Tests, abbreviated as the "I. E. R." tests. These had been devised under the supervision of Dr. E. L. Thorndike for testing intelligence. They were so used in this research that they tested both intelligence and deception at the same time. They consist chiefly of simple problems in arithmetic, sets of mixed-up words from which the pupil has to make completed sentences, known as "completion tests"; also tests of information, and tests of word knowledge and vocabulary.

The I. E. R. tests were first given without supervision. Then later another set, of almost precisely equal difficulty, was given under strict supervision. In the case of the vocabulary test, the children took the second trial home. If they brought back the paper with a much higher score than the first one had made, it was proof that they had received help or had used the dictionary. The same method was used to discover the classroom cheaters on these tests. Another set of tests was used to catch those who cheated in athletic contests.

In order to measure the stealing type of deception, one device was to give the children a puzzle to solve by arranging a number of coins in a certain way in a small pasteboard box. When the children returned the boxes there seemed to be no way by which the box used by each child could be identified, but they were secretly marked. As a result some children stole some of the coins.

Doctors Hartshorne and May also measured the lying type of deception in its two main forms: *first*, lying to escape disapproval or punishment; and, *second*, lying to gain approval or reward.

One method for finding the first type of liars was for the examiner to return some time after a class had passed the first set of tests and pass out a sheet with a number of questions, such as the following: *First*, Did you ever cheat on any sort of tests? *Second*, Did you copy any answers from the keys? Since exact records had been kept of all the cheaters and non-cheaters on the test in question, the liars were easily detected. From these data an "honesty score" or "truthfulness index" could readily be calculated for each pupil.

Elaborate statistical and mathematical methods were used to make sure that these tests and scores had high "reliability" and "validity." By reliability is meant that if you give the same type of tests at different times you get very similar results. By validity is meant that you are really measuring the thing you claim to measure.

As to reliability, the tests proved to be as reliable as ordinary intelligence tests. As we shall see later, what a pupil does on one test does not predict what he will do on any other test. But if a child had been tested with ten of the tests, it could safely be predicted what that child would do on the average on the ten remaining tests. For example, on the I. E. R. tests, if a cheating score were given to an individual in terms of the number of times he would cheat in ten opportunities, the examiner, by proper calculations, would not be wrong more than about six times out of ten thousand. Any court of justice would probably be satisfied with this degree of probability.

The tests appear to have high validity—that is,

they really measure deception. This was determined in many ways. If a child deceives on thirty such tests there is evidence that in the next thirty opportunities he will cheat from twenty to thirty times.

It is one thing to find out that some children cheat, lie and steal, while others in the same situation do not, but it is quite another thing to find out *why*. Such an undertaking is staggering even to the imagination, let alone to practical efforts to measure the causes in an experimental way. The investigators did not attempt to unravel the tangled skein of inner motivations to deception. They did, however, attack the immense problem of finding to what extent cheating, lying and stealing are associated with those social and biological facts of human life that have been supposed from time immemorial to affect human conduct. They made numerous calculations to discover how closely deception in the situations studied was associated with the following facts of life: Age, sex, intelligence, physical condition, emotional condition, occupation of parents, cultural background, family life (happy or unhappy, etc.), race and nationality, religion, school grade, retardation in school, attendance at school, school achievements, association of friends, sociability, suggestibility, attendance at motion pictures, work and play, deportment and motives (various types).

The girls almost uniformly cheated more than the boys on tests taken home. The authors believe this was due to the stronger desire of girls to make good in school rather than to an inferior sense of honor. In classroom, athletic and party tests both were alike in cheating. On the lying tests, the girls had conspicuously higher scores than the boys. The lying test was a series of seventy-two questions about the observance of conventional requirements. Perhaps, there-

fore, the girls could truthfully answer more of these questions in the affirmative than could the boys. It seems certain that the girls either lied more, or had more conventional standards. As the authors themselves say, "The fair sex may take its choice of these alternatives." Likewise, age seems to make little if any difference within the school grades five to eight.

Perhaps there is no belief more deep-seated in the public mind than that men and women of high ability and genius are of doubtful morals. In so far as this study indirectly relates to that problem, it indicates the contrary. In the situations under experiment, stupidity and deception went together. On the general average, the more stupid the pupils were, the more they stole, cheated and lied; the more intelligent they were, the higher were their average scores for honesty.

The reader must continually recall that all these results are only averages, and just because they are averages there are many exceptions to these general findings. Some pupils of low intelligence ranked high in honesty, and some of the brightest pupils ranked low. By and large, however, the brighter pupils, either being more cautious, or having more of what we might term common sense, or greater emotional stability, or better home training, or other factors that are usually associated with intelligence, cheated the less.

The athletic contests gave a rough index of each child's physical condition. One would suppose that the weaker pupils might cheat more than the stronger, in order to make a good showing; but there was no evidence that the weaker children compensated for their handicap by falsification.

The children were tested for emotional stability by a long series of questions—such as, What are you afraid of? What teachers have you disliked? In this

way a "neurotic index," similar to the one that was worked out for the soldiers during the war, was given to each child. It was found that those with a high neurotic index tended to cheat somewhat more than did the more stable group.

One of the most surprising discoveries was that the occupation of the parents had a very consistent relation to the honesty of the children. The parents were divided into four groups, as follows: *first*, professional, large business, accountants, architects, physicians, teachers; *second*, small business, foremen, highly skilled labor; *third*, skilled labor—plumbers, electricians, plasterers, mechanics, and *fourth*, unskilled laborers.

The children of the first group stand out conspicuously as the most honest. The last three groups were very much alike in the work done at home, but the first group was distinctly above the average.

Likewise, in some of the cheating tests that required doing tasks with eyes closed, the first group was far above the average of the others in honesty. Just why the children of a plumber or small business man should be less honest in keeping their eyes closed than are the children of bankers or physicians, can be only theoretically argued, but the fact that they were so, in these situations, was indicated by the tests. Part of the difference is no doubt due to the higher intelligence of the upper groups, but even with this allowed for, the difference in honesty was nearly three times as great as the difference in intelligence would account for. The authors suggest that occupational customs, the conversation of the father and his associates, and what might be termed trade morale, play a part in determining standards of honesty in various occupations. But, whatever the cause, the differences in honesty were real differences.

The old controversy as to whether a man's character is due to heredity or to environment, or both, was of course met with. This research could not answer so complex a problem, but it threw some light upon it. Brothers and sisters were found to resemble one another in intelligence. Evidence was given to show that this likeness can not be wholly accounted for by the fact that brother and sister have the same home influence. The likeness was explained in part, at least, by the fact of common heredity—that is, by common inborn tendencies or weaknesses.

Summing up many statistical tables, the authors conclude that the tendency to deceive is about as much an inherited characteristic, and about as closely related to one's parents and ancestors, as is one's general intelligence. Almost everybody admits that bright parents are more likely to have bright children than are stupid parents and morons, and that a bright boy or girl is more likely than the average to have a bright brother or sister. Our researchers found that honesty and dishonesty ran in families in about the same manner.

The research does not answer dogmatically the question: Do some races of people and the immigrants from some nations lie and cheat more than others? The children did not represent a complete sample of any one race or foreign nationality. Only two schools were studied intensively. In one of these, the Jews showed a slightly higher tendency to deceive than would be expected from their level of intelligence; but in the other school the Jews were less deceptive than any of the other four races tested. In one of the schools, the Scandinavians cheated less—far less—than the Americans, Germans, British and Jews, all of which racial groups, in that community, happened to be of higher economic level. It is clear,

therefore, that no broad conclusions as to the honesty of different races can be drawn from this research.

One of the finest things that came out was that in some schools there would be a particular teacher whose classes ran distinctly higher for honesty than did others in the same building. The authors became convinced that these exceptional cases were due chiefly to the fine personal influence of the teacher. In one school where the pupils were very dishonest, they passed the following year under one of these superior teachers. Within a year this class changed from the most dishonest to the most honest class in the building.

Some classes are known as the "best" or "worst" in the school from year to year. The authors found this was chiefly due to a kind of group morale, a sort of children's code that grows up from many causes and often becomes a dominant factor in the behavior of the children.

Three groups were intensively studied to find out the influence upon honesty of various handicaps—such as bad homes, quarreling parents, and a number of other factors—when combined in one unified score. The three groups were designated as follows: the honesty group—those who were entirely honest; the dishonesty group—those who were dishonest and lied about it; the confessing group—those who were dishonest and, when asked, confessed.

An enormously ingenious handicap score was worked out for each pupil in these groups. The character of the homes was scored by an elaborate system, and also the home atmosphere—the way the parents got along with each other, how they dealt with the child, and the like. One way of getting at the home atmosphere was a "good manners test." The pupil was asked to score as "true" or "false" such statements as the following:

"If soup is too hot, blow on it." "In helping yourself to sugar, use your own spoon." "A boy should not detain a girl to talk on the sidewalk." "When not in use the teaspoon should be (1) left in teacup, (2) placed on the table, or (3) placed on the saucer."

The answer to these questions gave an insight into the child's home life. Those with good manners cheated slightly the less. They were also rated for the handicap score on a great many other things, such as health, intelligence, religion and the like.

A few of the findings were the following: It was no handicap in being honest whether a child came from a Catholic, Jewish or Protestant home. Taken as a whole, the confessors showed the lowest intelligence, the lowest deportment in school, the poorest homes, the worst parents, and the lowest neighborhood. The dishonest group, in these respects, stand in between the confessors and the honest. It seems curious that the confessors had the worst home surroundings, and were of slightly lower intelligence. The reader must understand that there were a good many exceptions: some perfectly honest children came from miserable surroundings, and some big liars and cheaters from the best surroundings. But in percentages, however, twenty-nine per cent. of the honest had no handicaps at all, while only two per cent. of the dishonest were without handicaps of some kind, and every one of the confessors labored under handicaps. Stated in another way, out of seventeen possible handicaps, the honest children averaged two and a half apiece, the dishonest four and one-half, and the confessors six and one-fourth.

Children who attended movies more often than once a week were found to be more dishonest than children who attended less. This did not prove that the pictures caused the dishonesty. It may indicate that such

children have less home supervision, and many other things.

Here are some other findings: "Sociable" children were neither more nor less honest than "unsociable" children. Private school children were somewhat more honest than public school children of the same social level. Schools with progressive methods had somewhat more honest children than had schools with old-fashioned methods. Everywhere the atmosphere of the home and the sympathy and understanding of the parents were strong influences upon the honesty or dishonesty of children.

Are Protestant Sunday-school children more honest than other children? A real study was made of this question. There was no great difference between the two, in the samples studied. Those who attended regularly were no more honest than those who went occasionally, and those who had attended a number of years were no more honest than those who had attended a short time. This does not even attempt to evaluate the entire significance of the Sunday-school, nor does it describe all the Sunday-school children in the country. It merely shows the great necessity for further study. A sample of Jewish children who had both Sunday and week-day religious teaching was also studied. The several hundred children in this sample were no more honest on the tests than were those without this supposed advantage, although the religious teaching may have had other results of the greatest value.

A number of organizations have recently introduced systems into many schools for teaching character. Our authors studied two of these, which they call "System X" and "System Y." In System X, each child kept a daily record of certain good deeds, including truth telling. The child was rewarded for a

good record by being promoted from rank to rank. The research disclosed the startling fact that the ones that got the highest record and advanced the fastest, cheated the most. The average progress of a pupil in the System X was one button, or one rank, per term. The astonishing fact was disclosed that those who moved at this regular pace, cheated the least, while those who moved either slower or faster cheated the most. It was further found that those who had been in the organization the longest were the greatest cheaters. It was not clear whether this was because the organization unconsciously promoted the most proficient liars, or whether the system made them more proficient liars. At least no generally beneficial effects flowed from this method.

There are a number of other organizations that endeavor to build character by the use of camp craft, civic activities, and interesting and wholesome ways of occupying the leisure time of boys and girls. The lore of the Indian, the pioneer and the knight is variously used, often with great emotional power and literary beauty. One of these methods, here termed System Y, was especially studied. The authors sum up their investigation of the behavior of members of System Y with this significant statement:

"We can only conclude that in these places, this widely used agency for moral education, whatever its effects may be elsewhere, is either neutral or deleterious with regard to one of its major aims, namely, the teaching of honesty. This conclusion must at once be supplemented, however, for System Y as for System X and the religious schools, by the caution that in other ways it may be having a vast influence for good. But, with Y as with X and the rest, these other objectives also must some day pass through the refining fire of scientific measurements."

What, then, are the main conclusions of this great research? The first obvious demonstration is that moral behavior is a thing that can be measured. The second is that the effects upon moral behavior of various agencies and methods of teaching can likewise be measured.

Conduct and character are not, of course, the same thing, but this research shows that conduct, at least, is just as definitely subject to being measured and weighed as are other facts of nature. This certainly marks a significant advance in man's control over his own conduct and destiny, which is surely the final end and aim of all science.

The third outstanding demonstration is what the authors call "the specific nature of conduct," or the "specificity of conduct." By this they mean, *first*, that conduct is learned, and, *second*, it is learned with reference to particular situations. When a child lied or cheated on one test, it did not prove what he would do on the next test. A man may lie and cheat in one situation and be horrified at the thought of lying and cheating in some other situation. The man who cheats his banker to pay his gambling debts because he considers them "debts of honor" is a typical example. In other words, as these authors put it, honesty and dishonesty are "functions" and outcomes of the particular situation in which they are exhibited. If the situation is repeated often enough, the conduct, whether honest or dishonest, develops into a habit. This habit is a function of that situation, and will carry over into other similar situations only to the extent to which the situations have in them common elements.

Learning how to live, then, the authors conclude, is not different from learning any other set of skills. Success in arithmetic, for example, depends upon

learning a large number of skills, such as addition and subtraction. These are useful only when situations requiring addition and subtraction are met with. Nor do these skills aid the child in learning history or rhetoric. But, even if we sum up all of these separate skills, they do not, when added together, make that wonderful thing we call education. Over and above the sum total of all these skills and habit systems, there is a fine qualitative relationship between a man and his knowledge on one side, and life and society on the other, that the morally educated man has, and the morally uneducated man has not. Many a man of great learning does not have this kind of education.

These authors seem to me to conclude that the same thing applies to character. If my judgment of their broad conclusions be correct, they believe that honesty and dishonesty are achievements like ability in arithmetic or in mechanical operations. Some people have greater ability to acquire these skills than have others.

So, therefore, a man is not born with some special "sense" of honesty or any special "moral sense" whatsoever. His skills of behavior are all learned. A man may, therefore, be honest, not from any fine sensitiveness to human values, but because he has learned that it is the best policy. But he has not learned even this policy with reference to the whole round of human associations. He has learned merely a certain set of "safety first" habits with reference to particular situations. And, even if we could add up all these ways of behaving one by one, they would not make the thing we call character. "A man may possess all the virtues and not be virtuous;" he may *act* virtuously, and *act* honestly, and yet be a scoundrel.

For it is not the act in itself that distinguishes the

good man from the bad, but the "inner quality of the *man* himself as an organized and socially functioning individual." "We may add up his characteristics, whether these be virtues or vices, but the algebraical sum is not his character." Character does not consist merely in any set of acts; it involves, also, the inner attitude of the man toward his acts and toward others whom he suspects his acts will help or harm.

From these considerations, it seems to be the idea of these authors that moral education should proceed along two broad general lines: *First*, what is commonly called the "Removal of temptations" and of such factors as we have seen are associated with dishonest behavior. Among these temptations are rewards for honest conduct so alluring that they create dishonest conduct in order to obtain them. And among the associated factors are such things as the improvement of home background, family relations and community conditions. *Second*, carrying children through these types of experience in which the sense and sentiment of honor, as inner personal possessions, are the natural outcome and sole reward of the behavior; and this sense and sentiment of honor are to be learned, as anything else is learned, by having the child practise repeatedly those situations where he finds himself ethically at home—those situations by which and in which the child himself feels that his intelligence and will are in harmony with, and not deceptively against, the intelligence and will of his associates—which latter is the characteristic of all falsity of life and character.

Thus, as the child's experience enlarges to include new contacts with life, to which he has not yet had opportunity to apply his widening ethical habits, he will learn, *by the use of his intelligence*, how to in-

clude these new experiences in his ever-developing habit systems of moral decision and effort, and, thus, increasingly win his world to friendly intercourse with the highest trends of his own being.

In this way the child will come into a moral mastery of his world just as rapidly as it enlarges and demands of him an ever-new orientation in the presence of its expanding complexities. By this process he will achieve the only freedom there is, the possession within himself of the "insight and self-mastery" that not only enable him, but, by the insistence of his habit systems, drive him fearlessly to "challenge an imperfect world with a high ideal" of his own.

CHAPTER XVII

SCIENCE IS LEADING US CLOSER TO GOD

“MICHAEL, these Americans are too smart for you; you had better go back to your country village in Serbia.” Dr. Michael I. Pupin now relates that he said this to himself when as a Serbian peasant boy he came to this country and heard people speaking better English over the newly invented telephone than he could speak himself. Fortunately for America, the boy’s courage and intelligence survived the strain of adjustment in a new land. He was born in Serbia seventy years ago, and was graduated from Columbia University, New York, in 1883. He received his Degree as Doctor of Philosophy at the University of Berlin in 1889, the Degree of Doctor of Science from Columbia in 1904, and has received numerous other scientific degrees and honors. Since 1901 he has been professor of electro-mechanics in Columbia University. To mention only one of his many inventions, which have profoundly affected our daily life, we owe to his genius the Pupin loading coil, an invention of the utmost importance in the development of the modern long-distance telephone. The spiritual element in Doctor Pupin’s life has always been very strong. In the following interview he has outlined perhaps more intimately than anywhere else his personal faith as the outcome of a great life spent in investigating the constitution of the universe.

XVII*

SCIENCE is making us better Christians.

Science teaches us that the Universe is guided by an intelligent Divinity.

Science is teaching men how to cooperate intelligently with God; it is teaching men what His laws are and how to obey them.

Science is proving that the human soul is the greatest thing in the Universe, the supreme purpose of the Creator.

Science is leading us closer and closer to God.

Science has made us better homes and is teaching us how to make a better democracy and a better social life; it is thus preparing us for the greatest spiritual, artistic and intellectual life that men have ever known.

Science does not contradict belief in the immortality of the human soul.

Science is revealing God in greater and greater glory, and teaches us that in time we may possibly even see Him face to face.

These are the impressions which I carried away from a recent Sunday morning spent talking with Dr. Michael I. Pupin about the invisible service of science—one of the most beautiful and inspiring mornings of my life. It was certainly a privilege to sit and talk to one of the greatest mathematical

*While Doctor Pupin is not a psychologist, it seems extremely appropriate to conclude these chapters on various phases of psychology with an interview with a great physicist who has thought deeply upon the problems of the nature and destiny of the mind, the probability of its immortality, the general place of mind in the physical universe and its relationship to that "high unknown purpose of the world which we call God."

physicists, one of the greatest inventors and one of the greatest personalities living in the world to-day.

He sat at his big work-table over which were scattered sheets of paper covered with mathematical calculations. These were beyond my power to comprehend. But the philosophy, religion and spiritual life which he has arrived at, through his own intimate acquaintance with the ultimate things of the universe which mathematics and physics and chemistry have revealed, are so clear and simple that they can be understood by all.

President Nicholas Murray Butler, of Columbia University, is reported to have said recently that, while talking with Doctor Pupin, he felt that he was witnessing the curtain being lifted upon a new and brighter world. I believe he would make you feel the same way, and I should like to convey that feeling to you through his own words.

If any boy who reads this has never read Doctor Pupin's story of his own life, entitled, *From Immigrant to Inventor*, I trust this will inspire him to do so, as it is one of the greatest autobiographies in American literature. He came to America fifty-nine years ago as an ignorant Serbian peasant boy of eleven. In 1927 he was elected President of the American Association for the Advancement of Science, one of the highest scientific honors in the world. What he says, therefore, is the outcome, not only of profound scientific knowledge, but of a profound knowledge of life—its hardships, struggles, disappointments, failures and successes.

"I can show you best what I believe is the *invisible* service of science," Doctor Pupin began, "by calling your attention first to the real meaning of the wonderful *visible* service of science. Science has created all our industries: but most people do not realize

what it all means to their social, political and spiritual life. By learning how to govern their industries, which are the product of science, they are at the same time learning how to govern their homes, their country and themselves.

“Let us take as an example of this the American Telephone and Telegraph Company. There is a living example of how a democracy should be managed. Just study that organization: from top to bottom nothing but the ablest men and the finest cooperation.

“But that isn’t the most important thing. The chief thing is that it *belongs to the people*. In this way, it is educating vast numbers of people in the best way to manage big affairs. The majority of the stock is in the hands of the small man, the man who has five or six hundred dollars invested in it. The millionaires do not control the stock. Why, there are hardly enough millionaires in the country to supply the three thousand million dollars needed for our telephone industry alone. This same thing is true of all our great industries. Unless the little man is in them with his little savings, our industries simply can not be developed.

“You see this gives the little fellow a direct personal interest in the way the thing is managed. Nothing induces one to think so sharply as when he has a few hundred dollars at stake. That is the psychology of it. He insists that the ablest, best-trained men must manage it. And now, since he sees how this way of managing things brings him his nice little dividend on the dot, he is beginning to say: ‘Let’s have our government conducted in the same way. Let’s put it into the hands of trained men.’ He is only beginning to think this way about government, but he is rapidly becoming educated. Politicians, as a rule, are not trained men like the managers of our industries; they

are just politicians. They know how to pull the wires, but you can't govern the country properly by pulling wires.

"Now all this is doing two things: First, it is giving men in general confidence in science; it is showing them in a practical way that what the scientist tells them is true; and second, it is giving men a discipline, an education in managing big things in a cooperative way. Now I think this is going to lead men to apply the same methods to managing our democracy, our social and political life. And all this in turn will help in teaching men the real meaning of science to their souls and their spiritual life.

"I want you to understand clearly this great educational influence of science. Our great industries, created entirely by experimental science, are not only developing the wealth but are also developing the judgment and knowledge of the people about their social and political affairs. And I shall show you in a moment how this bears directly upon the spiritual influence of science. For it is not the philosopher sitting at his desk and evolving fine-spun theories who is teaching the people real democracy. It is this *wide diffusion of the ownership of our industries*, this practical discipline and education in the management of enormous enterprises which is building up a true and sound social democracy. It is giving us a sound, stable, wealthy country, and that is the necessary forerunner of a great spiritual development.

"You see, while the Germans were dreaming about social democracy, while Karl Marx and other European philosophers were dreaming about a cooperative commonwealth, we have been actually building one up in an entirely experimental way. There is no theory about it; it is just the outcome of actual ex-

periment; our people have merely found that this is the best way of doing things.

"I want to illustrate this situation of the everyday man just a little further. Some years ago I was at Ormond Beach, Florida, and played golf with Mr. John D. Rockefeller. He invited me to dinner, and after dinner I asked him what he usually did during his afternoons. He replied, 'I go for a drive and then I visit my friends in the village, especially the little boys and girls and talk to them.'

"I asked him what he talked to the children about.

" 'The philosophy of saving,' he replied. 'I tell them to save and put their money in the bank and then the bank will invest it and develop our industries so they can have better homes and schools. Then I give each one of them a nickel.'

"I said, 'That is a wonderful philosophy.'

" 'Do you appreciate it?' he inquired.

" 'I certainly do,' " I replied.

" 'Then you can have a nickel, too,' he added and gave me a nickel.

"I put it in my pocket and recalled that I had recently received a twenty-dollar gold piece at a directors' meeting. I took it out and said to Mr. Rockefeller: 'In order to show you how much I appreciate your gift and your philosophy I want to give you this gold piece.'

"He replied, 'It is hard to refuse, but I must, because it would be encouraging you in extravagance!'

"That was twenty-five years ago, and our big business men as well as the little men are now seeing more deeply than ever the wisdom of this philosophy. The little man who saves his nickels is the man who really builds and owns our railroads and the industries that make our wonderful life possible.

"Now, the reason I wanted to show you all this

first, is because it leads directly up to the fact that it is all a *preparation*. It is all this which has been getting man *ready for a great new spiritual life*. For, you see, physical science has been preparing our homes and our country and our schools, so that everything will be right for conducting the life which is favorable to art and literature and philosophy, and the things of a man's spiritual nature.

"I think that the highest form of spiritual life is not possible in a country which does not stand high in science. Take medieval Italy, France, England and Germany as examples. Spiritual life and religion were most highly developed in Italy first. This was because they began the Renaissance. They thus knew more about chemistry and physics and, through them, created more wealth and leisure than any of the others. France came next, then England, and finally Germany. When science had prepared each nation for it and got its industrial, economic and social life ready for it, that nation had its great religious awakening, and *not till then*. A poor nation can not live a rich and varied spiritual life; and it is physical science alone that makes nations rich.

"Men have to be made ready and their countries made ready before they can live a deep spiritual life. Everything happens that way. This earth began to develop plants and animals and living creatures generally just as soon as it was good and ready for them, and not before. The atmosphere had to have just a certain density, the proportion of oxygen and nitrogen had to be just so; the earth had to cool to a certain point, and the temperature from the sun's heat had to be within certain limits before life could develop.

"Then again, organic life, physical life, had to develop through millions of years before the spiritual

life started. It is the same way with a nation. The people must develop their industries, they must get through with the hard, rough, bitter struggle with nature and get their social, economic and political life well organized, before their minds and spirits can reflect deeply upon the things of religion and God. Of course in poor hard times and in war men do turn in a sense to seek help from God, but a wide positive spiritual life is something different and greater.

“You can not expect a nation which has not developed pure science—not only applied science and invention, but the pure science, that is, the philosophy and meaning of science—you can’t expect a nation before it has done this to build churches and temples and universities and write books and paint pictures and carve statues and develop profound spiritual philosophies and religion. Of course men always had a crude faith, but it was a faith built chiefly upon superstition. I am speaking of great faith, great religion, great art, great literature, great philosophy and exalted spiritual life.

“A nation can not have these things until it develops science. This is because it is through science that we learn about the Godhead more than in any other way. Spiritual life, without an understanding of the Godhead, an intelligent belief in the Godhead, the Divine Spirit, is impossible. And what reveals the Divine Spirit more than science itself? Can you tell me of anything?

“You see, science is constantly revealing God’s laws. When we obey those laws we are literally carrying out God’s Will, cooperating with the Divine purpose. It is the philosophy of science which discloses to us the meaning of the universe. Men can ask, ‘What does all this universe mean?’ But they can not find out except by means of the three things

which make up science, namely, accurate observation of natural objects and forces, exact mathematical calculation of the relationships among natural objects and forces and, lastly, careful experiment.

"These activities of the scientist are his way, at least one of his ways, of worshipping God; of trying to find out God's purposes and fulfilling them. It is through science that man has discovered that his own soul is God's greatest purpose in the universe."

At this point Doctor Pupin grew reminiscent and spoke of the spiritual life of his own boyhood. "When I was a boy in Serbia," he said, "I used to spend a part of my summer vacations, along with other boys, herding the grazing oxen which belonged to our fathers. At night-time I was enchanted by the stars, blazing in the firmament. I imagined that the light of these stars was a message from God telling us the hour of the night and the direction of the approaching dawn.

"Whenever the vesper bell rang, my mother, who was a pious woman, would say, 'Michael, do you not hear the divine message which calls you to church to assist the priest in his service at the altar of God?' Thus gradually I began to imagine that the sound of the church bell also was a message from God.

"It is not surprising that in my boyhood days I often asked myself two questions: What is sound? and, What is light? A search for an answer to these two questions has undoubtedly directed my scientific career.

"Now, in answer to the first question, many professors of physics stop when they point out that sound is due to the vibration of material bodies. They say nothing about the message which sound is conveying to our *souls*.

"To get this part of the story, we must follow the

vibrations in their passage through that marvelous receiving instrument, the ear, which speeds the message along myriads of tiny nerves to the central station, the brain. There, the soul of man interprets the *language* of sound. The physical vibrations are only a small link in the connection of the external physical world with the internal world of the soul. And the more I think of this, as a scientific man, the more do I recognize that my boyhood fancy was right when I imagined that the sound of the vesper bell was a message from God.

“To-day, when I hear Kreisler playing a Beethoven sonata, or when I hear any other great musician, I feel that he is making the vibrating strings speak a language which is a true message from heaven. It recalls again my mother’s words: ‘Michael, do you not hear God’s message which calls you to praise His everlasting glory!’

“That is one answer which science has given me to that boyhood question: What is sound?

“Now, the second question: What is light? The greatest glory of nineteenth-century science was the discovery, made by Faraday and Clerk-Maxwell, that light is an electro-magnetic phenomenon. But what does that mean? In a purely physical way, it means that a ray of light is a swarm of tiny electrical dots and dashes speeding through space like the electrical dots and dashes of wireless or ordinary telegraphy. These countless dots and dashes tell us that innumerable tiny electrical clappers—the electrons—are set in motion by the atoms and molecules of the radiating source. In our case, the chief radiating source is the sun. Each atom and molecule in the blazing sun is really an infinitesimal radio station, from which tiny electrons are being broadcast in all directions.

“Now, what do I mean by that? Let us see what

happens when you ring a telephone bell. You transmit a rapid succession of electrical pulses along the telephone wire; that is, a rapid succession of electronic motions. The electrons which you thus set moving are tiny electrical clappers; each of these clappers gives a jerk at the clapper of the telephone bell and makes it strike; the bell responds with a ring.

"Now, the sun is always sending these tiny electronic pulses to our earth; we call them radiation. They, like the electrical pulses which ring the telephone bell, strike the material bodies on earth, and communicate to their atoms and molecules the energy of their life. These terrestrial bodies are the receiving instruments for the messages transmitted by the luminous sun and stars; they are the bells which respond to the electronic clappers of the sun and stars.

"Each terrestrial body responds to these solar clappers in harmony with its own structure. For example, one rose responds to an electronic clapper which makes it sing out, 'I am red.' Another rose sings out, 'I am yellow,' when struck by another type of radiant clapper. The lily responds equally well to all the electronic rays and has no color; it sings out, 'I am white.' The whole terrestrial globe is a bell which responds to the strokes of these solar clappers. In this way, the sun is the source of all the life-giving energy on our Mother Earth.

"But this is not all that light means: Just as sound sets going the nerves of the ear to carry messages from the external physical world to the internal world of the human soul, so these electronic pulses set going the nerves of the eye which carry their messages to the brain. There, the soul deciphers and interprets their meaning. All these vibrations receive their true

meaning only when the soul deciphers the messages which these light waves are carrying. And, the more I think of it as a scientist, the more do I feel that those gleams of light from the quiet stars which fell upon my eyes as a boy, with the oxen grazing about me in the silent night, were really messages from God. Just as the telephone bell responds to the clapper, so my soul, responding like a bell to the tiny clappers of the luminous stars, felt the thrill of the celestial hymn which declared the glory of God.

“Now, since science has discovered that the physical universe, with all its electrons in motion, receives its true interpretation only as its messages reach the soul; and since science finds that the soul can decipher these messages, even those from the farthest star—which is millions of light-years away—does it not lead logically to the belief that the soul of man is the greatest thing in the whole universe? Indeed, does it not lead to the belief that the human soul is the highest purpose of God’s creative energy?

“There is also another line of argument which seems to me to lead toward the conclusion that the soul of man is the expression of God’s highest purpose. For example, we have been sneering for a long time at our puny earth, and saying, ‘It is such a tiny speck of dust in the universe that it can not amount to much.’ But, we say, ‘A star like Betelguese—that’s the big thing.’

“But is bigness the true standard of measure?

“True, Betelguese is an enormous thing, nearly three hundred million miles in diameter. Our whole solar system could swing around inside of it. But what is Betelguese? Nothing but a big gas bag—that’s all. With all its size, it has no soul. It can not hear the call which I heard as a little ignorant boy—and am still hearing to-day as an educated

scientist—to worship at the altar of Almighty God.

“These big hot stars are only the beginning of God’s creative energy, the beginning of cosmic history. But the human soul, in so far as science can penetrate, is the last chapter of this history as far as it has been written.

“And furthermore, it is in the soul of man, in that great world within us, that Divinity resides. And when we think of that, we are not so small. Nay, we are very important. Science has found nothing in the universe which even compares in importance with the life of man. Compared to the human soul, everything else sinks into insignificance.

“The stars had to condense and become fluid, and then solidify, and cool to a low temperature, before a planet such as our earth upon which life could exist, was possible. Of course there may be other planets like ours. If there are, there may be other souls, other organic lives. But science has forced us to believe that wherever the soul of man exists, that soul represents the highest product of cosmic creation.

“We have felt all this intuitively. Even the savage feels that he is the most important thing in the universe. But to this faith science has added *knowledge*, which means a higher faith. Science shows us more clearly the meaning of it all, and what is our relationship to the Creator.

“Wherever science has explored the universe, it has found it to be a manifestation of a coordinating principle and that coordinating directing principle I call Divine Intelligence. It leaves us no escape from the conclusion that back of everything there is a definite guiding principle, which leads from chaos to cosmos. We are faced with two alternatives: We can either believe that cosmos, the beautiful law and order, is simply the result of haphazard happenings, or

that it is the result of a definite Intelligence. Now, which are you, as an intelligent being, going to choose?

"Personally, I choose to believe in the coordinating principle, the Divine Intelligence. Why? Because it is simpler. It is more intelligible. It harmonizes with my whole experience.

"The theory that intelligent beings like ourselves, or intelligent processes like the movements of the stars, are the outcome of unintelligent haphazard happenings, is beyond my understanding. And why should I accept such a theory when I observe the evidence of a directing Intelligence every day?

"When you see the stars, each moving in its own pathway, or see a seed grow after a definite plan into a tree, or see a baby develop into a full-grown, self-directing human individuality, can you conceive of all that taking place as the result of haphazard happenings? Well, I can not.

"Why, I can not hear a man talking or playing a violin, or see any skilled workman at his work, without seeing that there is some directing Intelligence behind him and behind all things. That offers an understandable solution. I know what it means, because I can understand intelligence.

"Why should I deny a directing Intelligence back of all cosmic phenomena? Can there be a more reasonable assumption? To me as a scientist it is obvious. It was obvious to the prophets three thousand, yes even ten thousand years ago. From the crudest savage to the highest prophet it has always seemed obvious that there was a definite Intelligence back of everything. There is nothing which science has ever found out that contradicts this.

"Of course, you can not produce a mathematical demonstration about the Divine Being, in the same sense that you can demonstrate the laws that govern

the motions of physical bodies. The Divine Being is far too complex to permit of that kind of proof. But from time immemorial we have felt that our own intelligence is part of something higher. And we have not discovered in the material universe anything higher than the human soul, which manifests itself through our intelligence. And as the soul of man has developed, this intuition of Divine Intelligence has grown stronger. And now, in our day, have come most of our scientific discoveries about the universe. And not a single discovery that science has made tends in the least to contradict this innate feeling that a definite Intelligence is back of everything. Indeed, the more deeply science penetrates into the laws of the universe, the more it leads us to a belief in an Intelligent Divinity.

“So, you see that science, instead of taking God out of the world, as some have feared, brings men into a closer spiritual relationship with Him.”

At this point I said to Doctor Pupin: “There is one question upon which people everywhere are seeking light and that is: What does science lead us to believe about the Bible?”

“The Bible is a great spiritual repository. So is Milton’s *Paradise Lost*. So are many other books written by inspired men. They are simply books written by the prophets, the men who had a great intuition, a great Divinity within them. They are our greatest expressions of the soul of man.

“But it would be foolish to take the Bible literally, that is, as a literal book of fact and science. It would be foolish to suppose that the prophets of three thousand years ago should give a better expression of the soul than can a man of to-day, who has all our added knowledge.

“The scientist is likewise a prophet. I think he is the

greatest of prophets because he stands closer to God than men have ever stood. I am speaking, of course, of the scientist who has the spiritual elements developed within him. Some scientists haven't this. When you analyze the activities of the human soul you will find, speaking broadly, of course, that there are three rather distinct phases: namely, the intellectual, the artistic and the spiritual. That is, we manifest the soul's activities in these three ways.

"Now in some people the intellectual is very strong and the artistic and spiritual sides are very weak. And you take people who claim to be atheists and the like, even if they are keen scientists, they are not developed on the spiritual side. We should not condemn them; we should pity them. They are honest. But we should not condemn them any more than you should condemn me because I have a poor ear for music or a poor eye for color. I am sorry but I am just made that way.

"Some men are color-blind and some are spiritually blind. But take men in general, they are not spiritually blind. They can be misled, however, particularly in youth. Youth can be misled. There are those who scoff when anything spiritual is said; they scoff because the spiritual does not exist in their case, and they think it does not exist at all.

"Such scoffers mislead men, especially where they have wonderful intellects. Voltaire and perhaps Tom Paine are examples. These men are honest, well-meaning, but on the spiritual side under-developed. They think a life of pure intellect should satisfy everybody, but, it doesn't satisfy the spiritual side. Take Raphael, the painter. What a wonderful artistic activity his was—intellectual and spiritual at the same time!

"But these cubists and impressionist painters lack the spiritual. There is nothing spiritual in

a cubist. If so, I do not see it. Compare the cubist to a Raphael or an Angelo! In the latter you see art going hand in hand with great intellect and a wonderful spiritual life—a life in close touch with Divinity.

“The man who is not spiritual is not in touch with Divinity. He may be in very close touch with the physical laws of nature. He may understand the quantitative and mathematical relationship among natural forces, but he does not understand their spiritual relationships and their meaning.

“Of course when we speak of the spiritual, the artistic and the intellectual life, I think we owe it to the man to whom we speak to explain what we mean. What does spiritual life mean? Why, it means *‘in touch with Divinity.’* The Fundamentalists will tell you that you are not in touch with Divinity unless you take the Bible literally. That is not right. Take the Bible as a beautiful, spiritual composition—a beautiful, wonderful expression of the soul of the prophets; but I am not going to be limited and circumscribed in my religious life entirely by what the ancient prophets said, although they may be a great aid.

“The scientists know more about God than the ancient prophets knew. Why shouldn’t they? They have been learning about Him all these centuries, especially the last three hundred years. As a result the average man to-day understands the structure of the universe incomparably better than did the prophets of three thousand years ago. We scientists, therefore, ought to be able to teach the average man and we are able to teach him more about Divinity than the prophets could—the Divinity which, to a spiritually-developed scientist, seems so obviously present everywhere in the universe.

“I believe I can illustrate what I think science has revealed for man’s highest spiritual and religious life

by taking a text from Saint Paul. You remember the apostle said: 'We all, with open face beholding as in a glass the glory of the Lord, are changed into the same image from glory to glory. . . .'

"During the past three hundred years, since the Pilgrim Fathers landed at Plymouth Rock, science has revealed four distinct physical realities of the universe. Before that time men did not dream that these four realities existed. And these four realities, these four discoveries about the structure and nature of the universe, are, in my judgment, true glories of the Lord. Each one has brought man's soul just that much closer to beholding with open face the final Divine Glory behind everything.

"The first physical reality, the first Glory, revealed by science was when Galileo discovered the meaning of Matter in Motion. He was the first to formulate the law of the acceleration in the motion of material bodies. This was the beginning of modern physical science.

"A hundred years later, Newton crowned Galileo's discovery with his discovery of the Law of Gravitation. Nothing exhibits the beauty of this physical reality so well as the motion of the planets around the sun. Here we have a cosmic system of bodies in which each part moves along its own prescribed path with a precision impossible to attain in any mechanism constructed by the hand of man. Yet the only guiding force is gravitation. All matter everywhere is ceaseless motion, yet everything reduced to a simple law—a simplicity such as the world never saw before.

"Then came the second revelation of a physical reality—a new Glory. This was the discovery of Electricity in Motion. Benjamin Franklin and Michael Faraday must be mentioned first among the discoverers of this physical reality. Franklin discovered that

lightning is electricity in motion. This revealed to mankind a new source of power. Then later Volta and Faraday and Clerk-Maxwell explained the laws in accordance with which electricity moves.

"These proved to be just as simple as the laws which Newton and Galileo discovered, which govern the motion of material bodies on the earth or of the celestial bodies in the heavens.

"Then came the revelation of a third physical reality, a third Glory, namely, Radiant Energy in Motion. By that I mean that the whole universe is filled with the radiation of light and heat.

"Of course men always knew intuitively that light seemed to be everywhere. The ancients worshiped the sun, but did not have a clear knowledge of the laws of light. They did not know that radiant energy extends through the whole universe. But we find that the radiation from one star resembles the radiation from another star, just as one leaf resembles another.

"And, sixty years ago, Clerk-Maxwell, the great electrical mathematician, spoke like a prophet when he made the startling announcement that this radiation of light is a manifestation of moving electricity. The most precious among the fruits of this discovery of Maxwell is that the origin of all light radiation is in the motion of the tiny electrons, which are, as far as we know to-day, the unchangeable, primordial building stones of the material universe.

"Everything that moves seems to be deriving its breath of existence from the electrical forces which have their origin in these tiny electrons. These little workers infinitely small but infinitely numerous, by their combined activities make up the larger activities of that stupendous thing we call the universe.

"And this busy little worker, the electron, is the most law-abiding creature in the universe. It loves,

honors and obeys the laws, and its eternal mission is to serve. God employed the heavenly host of electronic workers to build the atoms, the molecules, and the galaxies of burning stars. These celestial furnaces, throbbing with the blazing energy of the electronic host, are molding all kinds of planetary castings, and tempering them so as to be just right for organic life.

"One of these planetary castings is our Mother Earth: it is a mere dust speck in the universe, but this dust speck is the home of the soul of man, and this lifts our tiny earth to a place of honor near the throne of God. The soul's very breath of life is the beautiful electronic music, and to be thrilled by the melody of that cosmic song is the highest aim in our study of electrical science.

"And now the biologists are revealing a fourth reality—a fourth Glory of the Lord. This Glory is the Science of Organic Life. It is the latest reality of the universe which science has given us. And, again, this living reality is found to be so very simple, so beautiful, so inspiring, so intelligent!

"The spiritually inspiring thing that the biologists have shown us is that all life has progressed from the lowest toward the highest. If one does not believe that life has been a progressive development, step by step, under the guidance of a coordinating principle, then he has a very poor idea of Divinity. For, if life has progressed from small beginnings up to man in, say, ten million years, where will it be ten million years from now? Man is revealed by science as a being who is constantly progressing from glory to glory, changing more and more toward the spiritual image of his Creator.

"You see that the realities of both physical science and organic science reveal a God, a Divine Intelligence that we, as intelligent beings, can depend on. We can

not place our faith in haphazard happenings, but we can place the utmost faith in an orderly Divine Intelligence. There is dependability, continuity, everywhere. Science finds that everything is a continuously-developing and intelligent process. It reveals man as a being with a soul which is progressing more and more toward Divinity in a universe of unbroken continuity."

At this point, I said to Doctor Pupin: "You say the law of the universe is continuity, that there is no break anywhere. Do you believe that death itself does not break the continuity of the life of the soul?"

"In order to answer that question," replied Doctor Pupin, "we shall have to look back just a moment, and ask another question: What is the only mystery to-day in electrical science? It is this: Where, when and how did the electron come into existence?"

"The sensible man will answer, God created the electron, and, therefore, only God knows, where, when and how. This eliminates the mystery at once. The rest we can see for ourselves. God created a host of electrons to be his assistants in building the universe. And when science discovered the electrons and learned to use them in man's service, it was our first glimpse of the Divine Method of creative operation. Consequently, when we light our houses or send a telegram, we are using the electrons—we are merely imitating the creative method of God.

"Let us see what happened after God had made the stars out of electrons: One of the celestial bodies, the earth, for example, got denser, gradually cooled, and became habitable for living things. Life began. We do not know where, when or how. Saint John said: 'In the beginning was the Word and the Word was with God. . . .' A spiritual scientist's translation would be: 'In the beginning was the Guiding Intelligence, and the Guiding Intelligence was with God.'

“Let us follow the story a little further through the infinite years, until finally we have man,—the soul of man,—as far as we know the highest product of God’s creative handiwork.

“Now, after God has spent untold time in creating man and endowing him with a soul—which is a reflection of His image, is it reasonable to suppose that man lives here on earth a short span of life—and then is quite extinguished by death? Is the soul going to perish when the physical body dies? Is the soul going to have existed in vain?

“It does not seem reasonable to me that a creation which has been going on for billions and billions of years, in so far as we can tell, for the very purpose of producing that wonderful soul, should cause the soul—your soul and my soul—to exist only as long as our physical bodies exist. Although science does not offer mathematical proof of the immortality of the soul, it gives us plenty of food for thought and belief, plenty of grounds for intelligent hope. And it adds to our conviction that our physical life is only a stage in the existence of the soul.

“You can certainly say that, in my opinion, all scientific evidence tends to show—not to prove, but to point toward the belief—that it is very unlikely the soul of man is going to cease its existence when the body perishes. The law of continuity and the general scientific view of the universe tend, I think, to strengthen our belief that the human soul goes on existing, and *developing*, after death.

“You see science is constantly revealing Divinity and man’s relationship to Divinity. Science is, therefore, the highest form of human theology, the highest form of reasoning about God. Science leads us straight to a belief in God, and this is the foundation of religion.

“Science does not prevent a man from being a Christian; but makes him a better Christian. It has made me a better Christian. For the next year I am going to talk to the students of various colleges on this higher spiritual meaning of science. My personal belief is that everything that happens in this great universe is for a purpose; and that purpose is the development of the human soul. That is where science and religion touch. Science adds immeasurably to the foundations of religious faith. Science will strengthen religion. It has strengthened mine—strengthened it very greatly.

“And these revelations of science, these Glories of the Lord, are coming faster and faster all the time. I have spoken of only four Glories; but there may be three or four, or three or four thousand, more Glories yet to come. The next revelations may come very quickly. We may not have to wait hundreds of years for new revelations. We are speeding up in regard to the meaning of the universe. This is the view of scientific men.

“And, if only three hundred years of scientific revelations have brought us so much nearer to Divinity, it may be that science will go on from Glory to Glory until even earthly men may with open face behold the glory of the Lord, and be changed spiritually more and more into the same image. It is reasonable to believe that it will continue to reveal Divinity and bring men closer to God. This view has led me on to a better and higher religion.

“But my religion does not contradict a single element of the religion which my mother and the people of my native village held when I was a boy. Science has simply brought to me a higher, broader view of the Creator.

“That is the real pleasure of scientific work. The

purpose of science is not merely to make material things and inventions to increase wealth and comfort. These things are certainly a blessing, but not the greatest blessing. If science does not assist me to give myself and others a better religion, a better understanding of the Creator, and a closer personal relationship with him; if science does not assist me in carrying out the Divine purpose, then I am a failure as a scientist. But science has made me a better Christian; I believe it will make better Christians of all men and women who try to understand its simple and beautiful laws, because they are the laws of God."

THE END

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